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Efficacy of Statin Therapy in the Prevention of Atrial Fibrillation in Patients after Coronary Artery Bypass Grafting

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BOCKERIA ET AL.: ***Efficacy of Statin Therapy in the Prevention of Atrial Fibrillation in Patients after Coronary Artery Bypass Grafting:*** Statin medication has shown good results in the prevention of the postoperative atrial fibrillation (AF) after coronary artery bypass grafting (CABG). ***Objective:*** To assess the role of statin medication in the prevention of AF after CABG. ***Material and Methods:*** A retrospective analysis of 225 medical records of the patients, aged 57.5±7.9 years (mean±SD), who underwent CABG. All patients was divided into two groups. The first group included those patients who did not received statin medication (n=93). We named this group as nSt-patients. Second group included patients who receive statin medication (n=132). We named this group as St-patients. Clinical data on all included patients were obtained in pre-, intra- and postoperative periods. The risk of occurrence of postoperative AF was evaluated using the Cox-regression model. Continuous variables were reported as medians (Me) with inter-quartile ranges (Q_1, Q_3). Categorical data were presented as percentages. ***Results:*** The rate of AF was 29% in nSt-patients and 9% in St-patients (P<0.001). On Day 4 after surgery, white blood cells (WBC) count was 10.9 (9.0, 13.0) $\times 10^9$ e/L in nSt-patients and 9.1 (7.6, 10.0) in St-patients (P<0.001). An analysis of WBC count day-to-day changes was performed in a subgroup of patients who developed postoperative AF. This analysis showed that the peak WBC numbers occurred on the day of arrhythmia manifestation. In this subgroup, WBC count increased from 10.4 (7.5, 12.3) on Day 1 after surgery to 10.9 (9.0, 13.0) $\times 10^9$ e/L on the day of onset of AF (P=0.008). According to the Cox-regression model, the risk of AF was 3.68 for prior AF and 0.31 for statin medication. ***Conclusion:*** In our study, we showed an association between the use of statin medication and AF in early postoperative period. *(J HK Coll Cardiol 2016;24:1-10)*

Atrial fibrillation, Coronary artery bypass grafting, Postoperative period, Risk factors, Statin medication

摘要

他汀類藥物治療在冠狀動脈旁路移植（CABG）後預防房顫（AF）一直表現出良好成效。**目的：**評估在冠狀動脈旁路移植後，他汀類藥物治療預防房顫的角色。**工具及方法：**回顧性分析225個曾經進行冠狀動脈旁路移植，年齡於57.5±7.9（平均值±標準差）病人的醫療記錄。所有病人分成兩組，第一組包括全部沒有接受他汀類藥物治療（n=93），這個組別病人被稱爲nSt-病人；第二組包括接受他汀類藥物治療（n=132），被稱爲St-病人。所得的病人臨床資料包括術前、術中及術後的所有時期。計算手術後發生房顫的風險使用 Cox 迴歸分析模型，連續變量報告中位數（Me）爲四分差範圍（Q_1, Q_3），分類數據顯示爲百分比。**結果：**nSt-病人的房顫發生率爲29%；St-病人爲

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9%（P<0.001），在手術第後四日，nSt-病人白血球細胞（WBC）讀數爲10.9（9.0, 13.0）×10⁹ e/L，St-病人爲9.1（7.6, 10.0）（P<0.001）。分析每日白血球值變化顯示亞組病人會發展手術後房顫。這分析顯示白血球量高峰值之時會發展心律失常的臨床表現。在這個亞組當中，白血球值手術第一天10.4（7.5, 12.3）增加至房顫發病的10.9（9.0, 13.0）×10⁹ e/L（P=0.008）。根據Cox迴歸分析模型，房顫的風險在優先AF爲3.68及他汀類藥物治療爲0.31。**結論**：在我們的研究發現，使用他汀類藥物治療與房顫發生在手術後初期有相關性。

關鍵詞：心房顫、冠狀動脈旁路移植、手術後期、風險因素、他汀類藥物治療

Introduction

Atrial fibrillation (AF) is the most common rhythm disorder occurring after coronary artery bypass grafting (CABG). AF occurs in 25 to 30% of patients after CABG.[1-4] The onset of AF is associated with a high risk of postoperative complications, such as hemodynamic instability, stroke and myocardial infarction. All these complications lead to prolonged hospital stay and large economic cost.[5-7]

Some researchers recommend amiodarone and beta-blockers to reduce the risk of postoperative AF.[8-10] However, it should be noted that such preventive therapy does not seem to be safe in all patients because of adverse effects of these drugs, such as hypotension and bradycardia associated with beta-blockers and proarrhythmogenic effect of amiodarone.[11] The difficulties in the prevention of AF after CABG is explained by a poor understanding of both the mechanisms of onset of AF in patients after the surgery and the impact of intraoperative and postoperative factors on the electrophysiological properties of the atria.[5,12]

Any cardiac surgery is associated with an inflammatory process that includes systemic and local inflammation.[13,14] CABG is associated with the increasing of the inflammatory markers, such as C-reactive protein and interleukin-6,[13] with a peak concentration on day 2 to 4 after the surgery, just when the postoperative AF morbidity achieves its highest rate.[13,15] Inflammation is supposed to be a cause of the AF by affecting as structural as electrophysiological properties of the atria.[16]

In a number of previous studies, statin therapy has been shown to be effective in prevention of the AF after CABG.[16-19] The reduction in CABG-related inflammatory markers was noticed when statins were used routinely prior and after the surgery.[13,20,21] However, other studies failed to demonstrate an antiarrhythmic affect of statins after open-heart surgery.[22-24]

The objective of this study is to assess the role of statin therapy in the prevention of the AF after GABG.

Material and Methods

General Design of Study

Design of this study was approved by the Ethics Committee (Protocol no.9, 07 February 2014) of the Bakoulev Center for Cardiovascular Surgery in Moscow, Russia.

The data on the health status of all consecutive patients with CABG were gathered retrospectively in the Department of Surgical Treatment for Interactive Pathology, Bakoulev Scientific Center for Cardiovascular Surgery (Moscow, Russia). Informed consent was obtained from all participants.

The following inclusion criterion was established for the purposes of the study: isolated CABG performed in 2013.

The patients were not included in our study if they matched the following criteria:

i) Concomitant surgery (e.g. CABG with valve repair/prosthesis, CABG with aneurysmectomy, CABG with Maze-procedure, CABG with surgical correction of ventricular septal defect)
ii) Severe renal failure (creatinine clearance calculated by the Cockroft-Gault formula <50 mL/min)
iii) Hypo- or hyperkalaemia
iv) Left ventricle ejection fraction (LVEF) <35%
v) Thyroid dysfunction (hyper- or hypofunction)

vi) Other hormonal disorders
vii) Immunosuppressive and anti-inflammatory medications for the treatment of comorbid conditions
viii) Cancer
ix) Organic disorders of central nervous system
x) Psychological disorders

After selection, all patients were identified into two groups.

The first group was composed of patients without statin therapy neither prior nor after the CABG. We named this group as nSt-patients.

The second group was composed of patients who have statin therapy for at least 3 days prior to the CABG and continuously after the operation. We named this group as St-patients. Period 3 days was defined randomly according to the literature data. It is supposed that anti-inflammatory effect of statins begins to appear after 3 days of starting the therapy.[19] In our study only original atorvastatin and rosuvastatin were used. We made no reckoning of the dose of statins.

Patients

In 2013, 415 CABGs were performed in Department of Surgical Treatment for Interactive Pathology, Bakoulev Scientific Center for Cardiovascular Surgery (Moscow, Russia). Our retrospective study included medical records on 225 patients with coronary heart disease (CHD) (196 men and 29 women), aged 57.5±7.9 years (mean±SD), who underwent CABG in in 2013. Two hundred and sixteen patients were excluded from the study because of nonfulfilment of the enrollment criterions. Workflow of patients' selection is presented in Figure 1.

Healthy status of all included patients was confirmed by the results of clinical investigation.

Finally, we have identified 93 (41%) nSt-patients and 132 (59%) St-patients.

Data Collection

Clinical data (results with data physical examinations, instrumental and laboratory investigations) on all included patients were obtained during their hospital treatment in pre-, intra- and postoperative periods. The source of patient's data is a hospital chart.

Outcomes

AF event after CABG was endpoint of presented study.

A postoperative AF event was defined an AF episode lasting for more than 5 minutes occurred postoperatively in the period 7 days after CABG. In accordance with the study protocol and clinically appropriate, all patients were under 24-hour bedside electrocardiography and blood pressure (BP) monitoring for the first 96 hours after the surgery. AF episode was confirmed on the evidence of the above data.

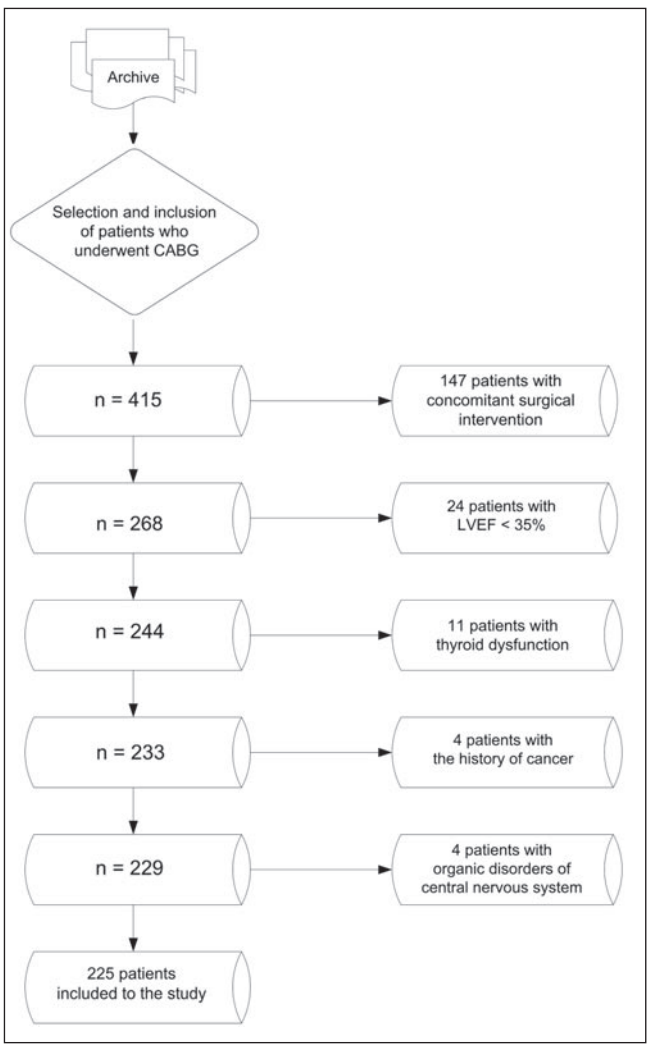

Figure 1. *Patients' selection in this study.*

Statistical Analysis

We apply the Shapiro-Wilk test to check whether the data were approximately normally distributed. Continuous variables were reported as medians (Me) with inter-quartile ranges (Q_1, Q_3) for non-normal data or mean (M) with standard deviation (SD) for normal data. Categorical data were presented as frequencies and percentages. To compare the variables between the patients' groups we used the Mann-Whitney test. The difference between the two proportions was assessed by t-test. Pared values were evaluated using Spearman's correlation (R). The risk of occurrence of postoperative AF was evaluated using the Cox-regression model. The obtained estimations were considered statistically significant if $P<0.05$.

We used the software package Statistica 10.0 (StatSoft Inc., Tulsa, Oklahoma, USA) for statistical analysis.

Results

The studied groups of St-patients and nSt-patients were comparable most anthropometric, clinical, instrumental and laboratory characteristics in pre-, intra- and postoperative periods. The relevant data for both groups are presented in Table 1. Significant differences between groups were found in the rate of AF and blood leucocytes in the early postoperative period. AF occurred in 29% of nSt-patients vs 9% in St-patients ($P<0.001$).

There was no significant difference in the length of hospital stay between groups: 9 (7, 11) in nSt-patients vs 9 (7, 11) in St-patients ($P=0.351$).

Also, there was a difference between groups in laboratory values: on Day 4 after surgery, white blood cells (WBC) count was 10.9 (9.0, 13.0) $\times 10^9$ e/L in nSt-patients and 9.1 (7.6, 10.0) $\times 10^9$ e/L in St-patients ($P<0.001$). On Day 1, WBC count was also lower in St-patients but the difference was insignificant ($P=0.391$) (Figure 2).

AF paroxysms occurred earlier in nSt-patients than in St-patients: Day 2 (2, 3) vs. Day 3 (3, 5), $P=0.039$.

An analysis of WBC count day-to-day changes was performed in a subgroup of patients who developed AF postoperatively. The analysis showed that peak WBC concentrations occurred on the day of onset of arrhythmia (Figure 3). In this subgroup, WBC count was 10.4 (7.5, 12.3) $\times 10^9$ e/L on Day 1 after surgery and 12.3 (10.0, 14.0) $\times 10^9$ e/L on the day of onset of AF ($P=0.008$). The difference remained significant.

The risk of occurrence of postoperative AF was evaluated using the Cox regression model (Table 2). The indicators with high correlation we not included together in the analysis. Such factors as «Prior AF» and «Antiarrhythmic therapy», «Prior MI» and «Therapy with beta-blockers» and «Therapy with ACE-Is» had high correlation ($R<0.7$). So only «Prior AF», «Prior MI» were included in the analysis.

Of these clinical variables included in Cox regression model, only prior AF and statin medication use were found to be statistically meaningful for the risk of AF after CABG. Results of the evaluation of the risk of AF in this study are given in Table 3.

Discussion

Blood WBC as inflammatory markers were chosen for our study as showing high prognostic value for the onset of AF.[25-27] Some previous studies have shown neutrophils level more specific as an independent predictor of postoperative AF.[26] It is known that during cardioplegia and bypassdue to ischemia and reperfusion, neutrophils are involved and secrete a wide variety of inflammatory biomarkers.

This study shows a strong correlation between blood WBC count and the risk of postoperative AF: the rate of AF was significantly higher in patients with a higher WBC count. Furthermore, peak WBC concentrations were observed on the day of onset of AF.

Statin medication prior to CABG and in the postoperative period was associated with reductions in the rate of postoperative AF and blood WBC count. In St-patients, peak blood WBC count occurred later than in nSt-patients. In our study, the delay was 1 day. The anti-inflammatory effect of statins seems to be due to their pleiotropic properties. A considerable reduction of the activity of all inflammatory markers under exposure to 3-hydroxy-3-methyl-glutaryl-CoA (HMG-CoA)

Table 1. Anthropometric and clinical characteristics of studied patients

Parameter	nSt-patients (n=93)	St-patients (n=132)	P-level
Age, years, M±SD	58.1±8.2	57.1±7.6	0.491
Male sex, no. (%)	81 (87.1)	114 (86.4)	0.872
Body weight, kg, M±SD	83.0±12.8	83.1±11.1	0.744
BMI, kg/m^2, M±SD	28,2±4.8	28,3±4.1	0.723
Smokers, no. (%)	30 (32.3)	53 (40.2)	0.221
Hypertension, no. (%)	72 (77.4)	94 (71.2)	0.299
Prior MI, no. (%)	58 (62.4)	74 (56.1)	0.166
Diabetes, no. (%)	9 (9.7)	11 (8.3)	0.537
Prior CVA, no. (%)	1 (1.1)	3 (2.3)	0.504
CRF, no. (%)	28 (30.1)	37 (28.0)	0.735
Prior AF, no. (%)	8 (8.6)	8 (6.1)	0.126
Euro SCORE II, Me (Q_1, Q_3)	1.87 (0.94, 2.15)	1.87 (0.94, 2.15)	0.754
Prior antiarrhythmic therapy, no. (%)	8 (8.6)	8 (6.1)	0.201
Prior PCI, no. (%)	3 (3.2)	7 (5.3)	0.453
Prior therapy with ACE-Is, no. (%)	91 (97.8)	129 (97.7)	0.951
Prior therapy with beta-blockers, no. (%)	92 (98.9)	129 (97.7)	0.773
LAD, cm, Me (Q_1, Q_3)	4.1 (3.9, 4.5)	4.1 (3.9, 4.4)	0.791
EDD, cm, Me (Q_1, Q_3)	5.4 (5.0, 5.7)	5.3 (4.9; 5.5)	0.111
EDV, mL, Me (Q_1, Q_3)	135 (124, 159)	134 (115, 154)	0.202
EFLV, %, Me (Q_1, Q_3)	60 (54, 63)	60 (56, 64)	0.411
Preoperative potassium, mmol/L, Me (Q_1, Q_3)	4,1 (3.7,4.3)	4,15 (3.8,4.3)	0.841
Preoperative WBC, x10^9/mL, Me (Q_1, Q_3)	9.9 (6.9, 10.1)	9.6 (7.3, 11.8)	0.412
Preoperative creatinine, mmol/L, Me (Q_1, Q_3)	93 (83, 103)	93 (86.5, 102.5)	0.958
Off-pump CABG, no. (%)	74 (79.6)	116 (87.9)	0.063
On-pump CABG, no. (%)	18 (20.4)	18 (12.1)	0.631
CPB time, min, Me (Q_1, Q_3)	99 (45, 123)	96 (65, 127)	0.342
Aortic cross-clamping time, min, Me (Q_1, Q_3)	56 (45, 66)	57 (45, 66)	0.715
APV time, h, Me (Q_1, Q_3)	7 (4, 9)	7 (4, 8)	0.854
Number of grafts, Me (Q_1, Q_3)	2 (2, 3)	2 (2, 3)	0.746
RCA bypass, no. (%)	51 (54.8)	77 (58.3)	0.603
Graft thrombosis, no. (%)	3 (3.2)	1 (0.8)	0.161
Cessation of cardiotonic support, days, Me (Q_1, Q_3)	3 (2, 3)	3 (2, 3)	0.055
Postoperative AF, no. (%)	27 (29.0)	12 (9.1)	**<0.001**
Day of AF onset, Me (Q_1, Q_3)	2 (2, 3), n=27	3 (3, 5), n=12	**0.039**
WBC count on Day 1, x10^9/mL, Me (Q_1, Q_3)	10.4 (7.5, 12.3)	9.5 (7.4, 12.0)	0.391
WBC count on Day 4, x10^9/mL, Me (Q_1, Q_3)	10.9 (9.0, 13.0)	9.1 (7.6, 10.0)	**<0.001**
WBC count on the day of AF onset, x10^9/mL, Me (Q_1, Q_3)	12.3 (10.0, 14.1), n=27	14.0 (10.0, 14.0), n =12	0.960
Postoperative pneumonia, no. (%)	3 (3.2)	7 (5.3)	0.452
Number of bed-days, Me (Q_1, Q_3)	9 (7, 11)	9 (7, 11)	0.351
Intensive unit bed-days, Me (Q_1, Q_3)	1 (1, 2)	1 (1, 3)	0.910
Antiarrhythmic therapy, no. (%)	8 (8.6)	8 (6.1)	0.201
Therapy with ACE-Is, no. (%)	93 (100)	132 (100)	1
Therapy with beta-blockers, no. (%)	92 (98.9)	130 (98.5)	0.943

BMI, body mass index; CVA, cerebral vascular accident; MI, myocardial infarction; CRF, chronic renal failure; ACE-Is, angiotensin-converting-enzyme inhibitors; LAD, left atrial diameter; EDD, end-diastolic dimension of left ventricle; EDV, end-diastolic volume of left ventricle; EFLV, ejection fraction of left ventricle; CPB, cardiopulmonary bypass; APV, artificial lung ventilation; RCA, right coronary artery; WBC, white blood cells.

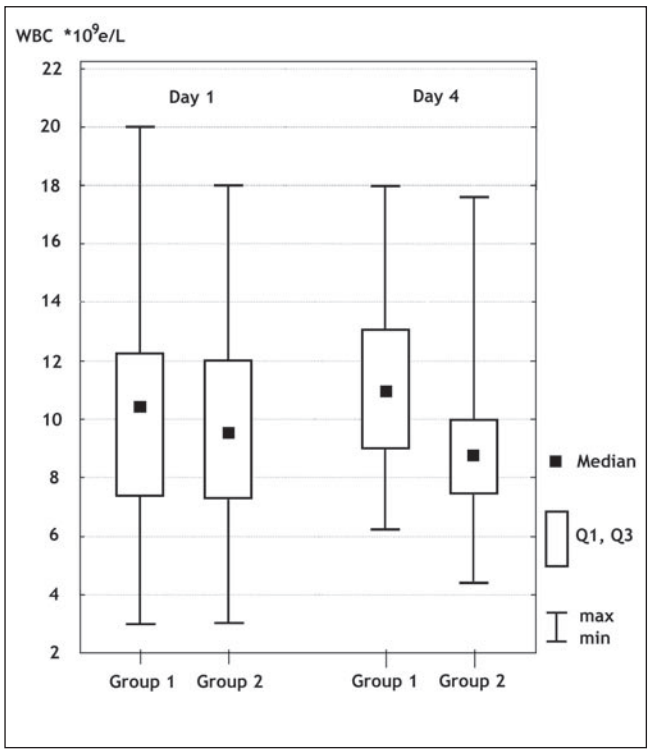

Figure 2. *Blood WBC count in studied groups on Day 1 after surgery and Day 4 after surgery.*

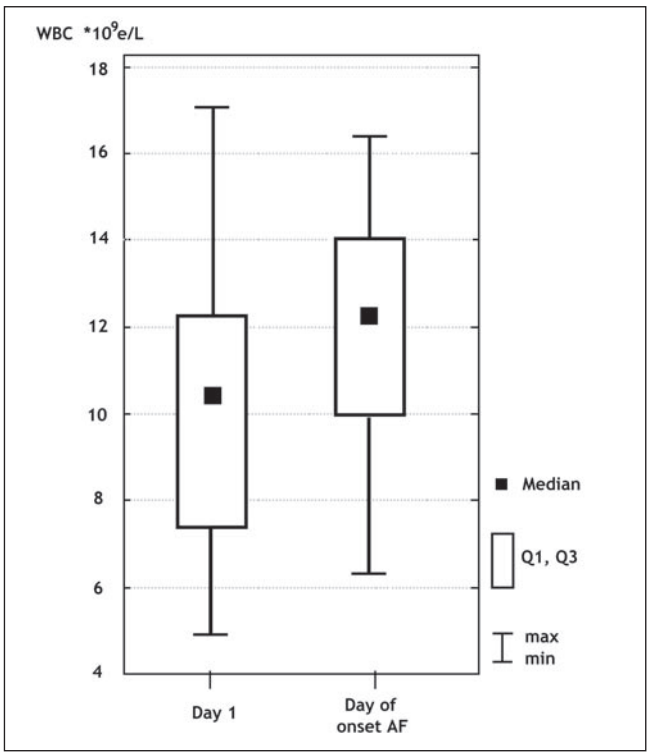

Figure 3. *Blood WBC count on Day 1 after surgery, and on the day of onset of AF.*

Table 2. Clinical variables used in the Cox model of regression for evaluation of the risk of occurrence of AF in patients after CABG (χ^2=38.42, P<0.001)

Parameter	Regression coefficient β	Standard error	Risk index Exp (B)	Wald test	P
Statins	**-1.145**	**0.357**	**0.318**	**10.24**	**0.001**
Prior AF	**1.251**	**0.396**	**3.493**	**9.96**	**0.002**
Number of grafts	0.419	0.231	1.520	3.28	0.070
Diabetes	-1.088	0.779	0.336	1.94	0.163
EDD	0.453	0.356	1.572	1.61	0.204
Preoperative creatinine	-0.017	0.014	0.982	1.38	0.238
Age	0.023	0.022	1.023	1.02	0.310
CRF	0.505	0.505	1.657	0.99	0.317
Prior MI	0.359	0.380	1.432	0.89	0.344
EF	0.014	0.021	1.014	0.43	0.510
Prior PCI	-0.462	1.037	0.629	0.19	0.655
CPB time	-0.001	0.003	0.999	0.14	0.706
Sex	0.012	0.520	1.012	<0.01	0.981
etc.					

Note. Statistically significant predictors (P<0.005) of postoperative AF and first 11 non-significant factors are summarized in Table 2 (presented in descending order of significance). Other indicators included in the multiple analysis (Table 1) are not presented in the Table 2.

Table 3. Evaluation of the risk of AF depending on statin medication and prior AF variables (χ^2=16.14, P<0.001)

Risk factors		Risk of AF in accordance with the Cox model of regression	Level of AF risk	Rate of AF in this study
Statins	Prior AF			
Yes	No	0.31	Low	6.5%
No	No	1.00	Moderate	25.6%
Yes	Yes	1.15	High	50.0%
No	Yes	3.68	Very high	54.5%

reductase inhibitors seems to be due to their effect on neutrophils: increasing apoptosis and enhancing cytokine secretion. Chello et al. in their blind placebo-controlled study showed that using simvastatin 40 mg/daily during 7 days after surgery reduced peak anti-inflammatory markers count (interleukin 6 an 8).[28] The anti-inflammatory effect of statins begins to appear before their hypolipidemic effect. In our study, statin medication started just in 3 days before the intervention led to significant results in terms of prevention of postoperative AF.

In our study, the regression analysis showed that only two factors could have significant influence on the onset of postoperative AF, which are prior AF and statin medication. Moreover prior AF increases the risk of postoperative AF significantly due to arrhythmogenic cardiomyopathy while the statin medication significantly decreased the risk of postoperative AF (P=0.001). In accordance with the Cox model of regression, the risk of AF was lowest (6.5%) in St-patients without a history of AF, moderate (25.6%) in nSt-patients without a history of AF, high (50%) in St-patients with prior AF and very high (54.5%) in nSt-patients with a prior AF.

Marìn et al. obtained similar results in a study on 234 patients.[29] In the multivariant analysis, statin therapy was found to be associated with a reduction of the rate of AF after GABG (HR 0.52, 95% CI 0.28; 0.96, P=0.038). The TIMP-1/MMP-1 ratio (TIMP-1 is tissue inhibitor matrix metalloproteinase-1, MMP-1 is matrix metalloproteinase-1) in 24 h after GABG was higher in patients without a history of AF (P=0.043). Statin medication was associated with increases of both the TIMP-1 level and TIMP-1 / MMP-1 ratio (P=0.027 and P=0.036, respectively). It should be noted that, unlike us, Marìn used TIMP-1 and MMP-1 as inflammatory markers.

Kimura et al. showed experimentally that fluvastatin could inhibit the activities of leukotriene B_4 and platelet activation factor.[30] The lipid-independent anti-inflammatory effect was confirmed in an experimental study performed by Scalia et al.[31] who observed an inhibiting effect of simvastatin and cerivastatin on actin-mediated membrane polymerization and integrin-binding molecules of CD 11a, CD 18 and VLA-4.

As far back as 1999, Ikeda et al. found that fluvastatin and simvastatin exert a considerable inhibiting effect on angiotensin 2-induced secretion of interleukin-6 in the culture of human SMCs. This effect was accompanied by a reduction in the level of C-reactive protein.[32]

In a few studies, it was shown that statin therapy could lead to the decrease in the length of hospital stay due to a reduction of the AF.[5-7] We have not seen this in our study.

No significant association between several clinical characteristics (chronic renal failure, prior myocardial infarction, etc.) and risk of AF after CABG was shown. It was also shown in previous studies.[33-35] Whereas there is different data on the influence of chronic renal failure on the onset of postoperative AF showing as significant association[36,37] as well as no association.[38,39]

Otherwise other studies have shown significant association between postoperative AF after CABG and left atrial parameters,[40] perioperative intra-aortic balloon pump use,[41] which was not shown in our study. The reason may be due to the design of our study, which is reflected in the Limitations section.

Postoperative pneumonia according to some authors was also associated with postoperative AF.[42] In our study it was a rare complication. Moreover the

statistical analysis was presented for pre- and intraoperatively characteristics, so the influence of post-operative pneumonia could not be evaluated according to the design of the study.

Conclusion

AF is one of potential complications that can cause hemodynamic instability in patients after GABG and increase the risk of stroke and postoperative mortality. In our study, we showed an association between the use of statin medication and AF in early postoperative period. Anti-inflammatory properties demonstrated by statins are one of the factors that may explain why their beneficial effects on the clinical course and prognosis of the atherosclerotic vascular disease are more pronounced than could be expected.

Limitations

There are some limitations of our study. The main one is related to the design. As it was retrospective trial, there was no randomization and placebo-control.

It is known that all the patients with coronary artery disease should get statin medication according to the updated ESC/ACC/AHA guidelines. And if conduct prospective randomized trial half of the patients are supposed to discontinue the lipid-lowering therapy. In our opinion it is impossible from the ethical position according to the modern recommendations. In a retrospective design of the study we were able to enroll the patients who were not taking statins for other reasons (social factors, economic factors, etc.).

It should be noticed that the authors did not analyze the reasons for not receiving statin therapy prior to the surgery. The study was retrospective and to perform CABG there is no need for patients to receive statin therapy. Statin medication and lipid levels control is usually within the outpatient cardiologists cognizance. In addition, it is known, that outpatient treatment compliance is still unsolved problem.

In the presented study we have not evaluated the influence of different doses and duration of statin therapy due to lack of retrospective information. Chen et al.[43] evaluated the correlation between statin therapy effectiveness in postoperative AF prevention and different doses and duration of the therapy. Analysis has shown statistically significant association between the duration of preoperative statin therapy and risk of postoperative AF, but no significant association was show between statin doses and lower risk of postoperative AF.

The main limitation of the study was no information about serum lipid profile before the operation, so the information was not included into the analysis. So we have no statistically significant data to propose that the anti-fibrillatory effect of statin extend beyond its lipid lowering action.

Such factors as «Prior AF» and «Antiarrhythmic therapy», «Prior MI» and «Therapy with beta-blockers» and «Therapy with ACE-Is» had high correlation between each other ($R<0.7$) and so were excluded from the analysis.

Conflict of interest

None declared.

Acknowledgements

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Arrhythmia in Severe Fever with Thrombocytopenia Syndrome

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WIWANITKIT: ***Arrhythmia in Severe Fever with Thrombocytopenia Syndrome:*** There are many new emerging infectious diseases in the present day. In cardiology, the important concern is on the cardiac presentation of any new disease. Severe fever with thrombocytopenia syndrome is a new disease firstly reported from China and becomes the important emerging infection in East Asia at present. The disease is proved to be due to the new severe fever with thrombocytopenia syndrome virus, a newly identified pathogenic Bunyavirus, infection. This disease usually presents with high fever and thrombocytopenia. Focusing on cardiac presentation, it is evidenced that the cardiac arrhythmia can be observed in this new disease. Here, the author tries summarizing the observed arrhythmia in abnormal electrocardiograms from available 3 reports. Of 109 patients who got electrocardiography studies, 27 cases (24.8%) had arrhythmia. Focusing on the types of arrhythmia, there are sinus bradycardia (n=5), supraventricular arrhythmias (n=8), premature ventricular beats (n=5), atrial fibrillation (n=7), atrioventricular block (n=2), right bundle branch block (n=1) and ventricular fibrillation (n=1). Based on this summarization, the rate of arrhythmia in the patient with severe fever with thrombocytopenia syndrome is very high and there are several forms of possible arrhythmia in the patients. Sometimes, afebrile cases of severe fever with thrombocytopenia syndrome can be seen and the arrhythmia might be the chief complaint of the patient. In the present day with, good international transportation, the cardiologist has to keep in mind on the possibility of severe fever with thrombocytopenia syndrome in any patient with arrhythmia. *(J HK Coll Cardiol 2016;24:11-13)*

Arrhythmia, Fever, Presentation, Severe, Thrombocytopenia

摘要

近年出現了很多新興的傳染疾病，在心臟科，最重要的關注點是在任何新疾病中的心臟表現。「嚴重發熱伴血小板減少症候群」是首發於中國的新病症，現時並已開始成爲東亞地區重要的新興傳染病。該病已被證實是由於一種新的嚴重發熱伴血小板減少綜合症病毒（一種最新被鑑定病原爲本雅病毒科）的感染，此病通常會出現高燒及血小板減少症狀。聚焦於心臟的表現，可觀察這種新疾病會出現心律失常。在此，作者嘗試在現有的三個報告中，總結由不正常心電圖所觀察的心律失常。在109個進行心電圖研究的病人中，27個案例（24.8%）出現心律失常。仔細分析這些心律失常的類別，包括竇性心動過緩（n＝5）、室上性心律失常（n＝8）、室性早搏（n＝5）、心房顫動（n=7）、房室傳導阻滯（n=2）、右束支傳導阻滯（n=1）及心室顫動（n=1）。基於這些觀察所得的結論，在嚴重發熱伴血小板減少症候群的患者中有相當高比率出現心律失常，而且所出現的心律失常亦可能有多種類別。有時，「嚴重發熱伴血小板減少症候群」病人中可以出無發熱症狀，而心律失常甚至是病人主訴的病徵。現時國際交通發達，心臟科醫生必須時刻謹記心律失常有可能發生在任何患「嚴重發熱伴血小板減少症候群」的病人身上。

關鍵詞：心律失常、發熱、表現、嚴重、血小板減少

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Introduction

Infection is an important group of medical disorder. There are many new emerging infectious diseases in the present day. The good examples are emerging atypical influenza virus infections, new Ebola disease and Middle East Respiratory Syndrome (MERS). In cardiology, the important concern is on the cardiac presentation of any new disease. The occurrence of cardiac arrhythmia in new emerging infectious disease is very interesting. Recently, Wiwanitkit reported the concern on cardiac arrhythmia induced by new Ebola disease.[1] It is no doubt that the cardiac arrhythmia can be a forgotten clinical feature in the new disease.[1]

Here, the author will specifically focuses interest on the new disease, "severe fever with thrombocytopenia syndrome". Severe fever with thrombocytopenia syndrome is a new disease firstly reported from China and becomes the important emerging infection in East Asia at present. The disease is proved to be due to the new severe fever with thrombocytopenia syndrome virus, a newly identified pathogenic Bunyavirus, infection.[2] This disease usually presents with high fever and thrombocytopenia.[3] Focusing on cardiac presentation, it is evidenced that the cardiac arrhythmia can be observed in this new disease.

Materials and methods

This short study is a retrospective analysis on the clinical data on cardiac arrhythmia seen in cases with severe fever with thrombocytopenia syndrome. The author used the standard database (PubMed and SCOPUS) search for finding the publication on severe fever with thrombocytopenia syndrome. The reports with complete data on electrocardiogram were recruited for further detail analysis.

Results

Here, the author tries summarizing the observed arrhythmia in abnormal electrocardiograms from available 3 reports.[1,4,5] Of 109 patients who got electrocardiography studies, 27 cases (24.8%) had arrhythmia. Focusing on the types of arrhythmia, there are sinus bradycardia (n=5), supraventricular arrhythmias (n=8), premature ventricular beats (n=5), atrial fibrillation (n=7), atrioventricular block (n=2), right bundle branch block (n=1) and ventricular fibrillation (n=1).

Discussion

Severe fever with thrombocytopenia syndrome is a new problematic infectious disease. It is a main concern in China and East Asia at present.[3] The disease is a new emerging viral tick-borne zoonosis.[3,6] Also, the direct human to human contact has recently been reported as a mode of disease transmission.[6,7] This new disease has a wide clinical spectrum. Li reported that the main clinical features of severe fever with thrombocytopenia syndrome include "high fever, thrombocytopenia, leukocytopenia, gastrointestinal disorders, and multi-organ dysfunction, with a high viral load and a high case-fatality rate".[6] Nevertheless, in some cases, it might be asymptomatic[8] and there is usually no hemorrhagic complication despite severe thrombocytopenia.[9] In an unusual cases, atypical clinical presentation such as neurological presentation can be seen.[10]

Focusing on cardiac problem in severe fever with thrombocytopenia syndrome, Wiwanitkit reported that T wave disorder was common in the patients with this syndrome indicating possible direct cardiac involvement.[11] Here, the author summarize on the arrhythmia problem in cases with severe fever with thrombocytopenia syndrome. In the study, the author found cardiac arrhythmia in about ¼ of cases. Based on this summarization, the rate of arrhythmia in the patient with severe fever with thrombocytopenia syndrome is very high and there are several forms of possible arrhythmia in the patients. Sometimes, afebrile cases of severe fever with thrombocytopenia syndrome can be seen and the arrhythmia might be the chief complaint of the patient.[4]

Cardiac arrhythmias in the subjects might be secondary to many confounders, apart from the direct

effect of severe sepsis related to Bunyavirus infection. Confounding variables which could precipitate cardiac arrhythmias are electrolyte disturbance, cardiac enzymes, underlying pre-existing structural heart diseases, thyroid dysfunction, hemodynamic status (e.g. any septic or cardiogenic shock), ventricular function, LA sizes, etc. However, these data are usually not mentioned in the summarized reports. Nevertheless, focusing on the reported baseline epidemiological parameters of patients (age range 17-77 years old, average 55.2 years),[1,4,5] most of the patients are more than 50 years old and have the risk of possible underlying cardiovascular problem. Hence, the problem is likely to be the secondary effect of hemodynamic instability and septicemia. Focusing on the possibility of direct effect of Bunyavirus infection (e.g. viral myocarditis, direct viral infiltration of conduction system), there has never been report on viral induced cardiac histopathology in cases of severe fever with thrombocytopenia syndrome. Nevertheless, the problem due to other Bunyavirus in animal model is observed.[12] The cardiac pathology in severe fever with thrombocytopenia syndrome has to be further systematically studied. Another myth on this topic that can be further research topic is the response of cardiac arrhythmia to pharmacological therapy. Indeed, ribavirin treatment is mainly used for management of the case, however, there is no report on observation on the cardiac arrhythmia.

Conclusion

In the present day with, good international transportation, the cardiologist has to keep in mind on the possibility of severe fever with thrombocytopenia syndrome in any patient with arrhythmia.

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Reaching an Unreachable Left Main Coronary Ostium in a Patient with Dilated Aortic Root

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WU AND TSUI: ***Reaching an Unreachable Left Main Coronary Ostium in a Patient with Dilated Aortic Root.*** This case report describes the use of an extended guiding system with an anchoring coronary guidewire to facilitate diagnostic coronary angiography and subsequent coronary stent delivery in a patient with severe aortic regurgitation and dilated aortic root. *(J HK Coll Cardiol 2016;24:14-17)*

Aortic, Coronary, Left, Main, Regurgitation

摘要

這個案例闡述使用具有固定冠狀動脈引導線的延伸導向系統幫助診斷冠狀動脈血管造影檢查，其後爲嚴重主動脈瓣逆流及主動脈根部擴張病人進行置入冠狀動脈支架。

關鍵詞：主動脈、冠狀動脈、左面、主要、逆流

Introduction

Catheterizations of the coronary ostia in patients with dilated aortic roots are technically demanding which may require special techniques. We describe the use of an extended guiding system with an anchoring coronary guidewire to facilitate diagnostic coronary angiography and subsequent coronary stent delivery.

Case

A 83-year-old male was admitted for non-ST segment elevation myocardial infarction (NSTEMI) in March 2015. He was an ex-smoker and he had past history of essential hypertension. He presented with angina at rest. 12 lead electrocardiogram was performed after admission which showed ST segment depression over V3-6. Serum troponin I level was elevated to 11 ng/mLitre (<0.03 ng/mLitre). Echocardiogram showed dilated aortic root, and the dimensions of aorta at the level of aortic sinus and sinotubular junction measured at the parasternal long axis view were 5.19 cm and 5.14 cm respectively (Figure 1). Severe aortic regurgitation was noted at multiple views (Figure 2). The left ventricular ejection fraction was 53 percent. Medical treatment for NSTEMI was initiated which included aspirin, clopidogrel and low molecular weight heparin, however patient had persistent angina. Therefore the potential need of coronary revascularization was explained to patient, which included the option of coronary artery bypass graft (CABG) for possible obstructive coronary artery disease and concomitant aortic valve replacement for severe aortic regurgitation. However patient refused open heart surgery. He only accepted percutaneous route of coronary revascularization.

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We proceeded to coronary angiogram via the right radial artery using the 6 F sheath. Engagement of the left main coronary artery ostium was difficult with 5 Fr Tiger II Catheter (Terumo) as the aortic root was dilated. Therefore selective angiogram of right coronary artery (RCA) was performed first by the same diagnostic catheter, which showed chronic total occlusion over the middle segment of RCA. Subsequent engagement of the left main coronary artery was failed by 6Fr Judkin's Left 3.5, 4, 5 and 6 diagnostic catheters (Cordis). In this regard, we performed non-selective contrast injection over the coronary sinus which could only vaguely delineate the left main coronary artery ostium and apparently an obstructive lesion was seen over the proximal segment of left anterior descending artery (LAD). We then tried cannulation of left main coronary artery by 6Fr Amplatz Left 1, 2, 3, 6F Extra Back Up 4, 4.5, and 6Fr Multipurpose diagnostic catheters (Cordis) but we were still in vain.

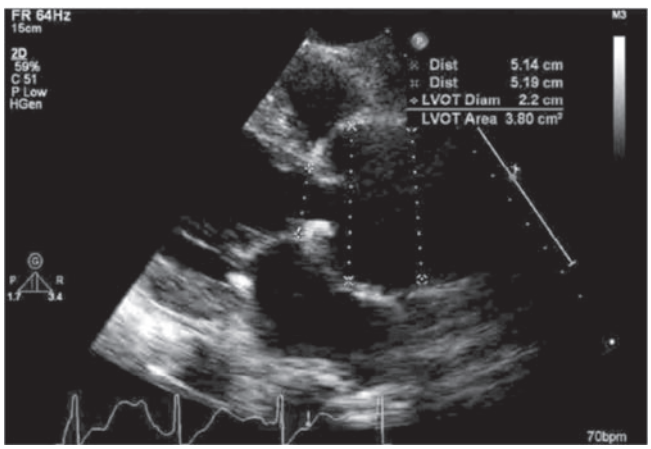

Figure 1. *Dilated aortic root from parasternal long axis view.*

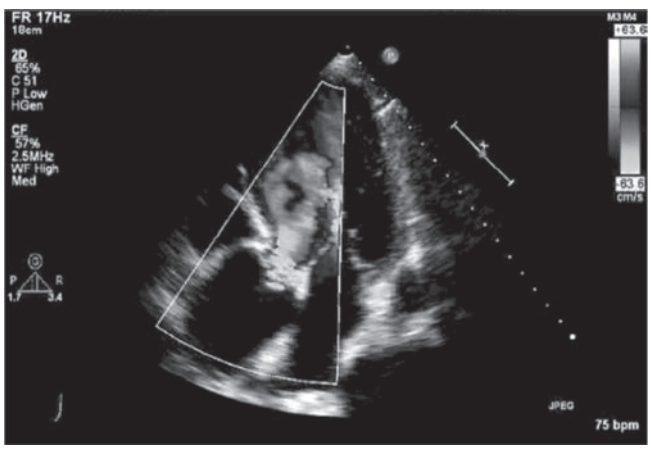

Figure 2. *Dilated aortic root with severe aortic regurgitation from apical five chamber view.*

As the left main coronary artery ostium was unreachable via the right radial artery, we switched the access site to the right femoral artery. A 7Fr femoral sheath was inserted. Again, engagement by 7Fr Extra Back Up 4 and 4.5 guide catheters and 6Fr Multipurpose guide catheter (Medtronic) were all failed. Wiring of ostium was then attempted by NS Runthrough coronary guidewire (Terumo) through the unengaged guide catheter, but such strategy was unsuccessful even after insertion of J-tipped 0.035 inch wire to change the configuration of the guide catheter (Figure 3).

After that, a 7Fr GuideLiner catheter (Innotronik) was inserted which extended the working length of the 7Fr Extra Back Up 4.5 guide catheter but cannulation of the left main coronary artery ostium was still unsuccessful. This extended guiding system, however, could be manipulated closer to and orientated more towards the left main coronary artery ostium. With this extended guiding system, attempts were made to manipulate the NS Runthrough coronary guidewire (Terumo) into the left coronary artery, but it was still difficult (Figure 4). Yet after repeated manipulation of the guiding system and its orientation, the coronary guidewire subsequently could reach the left main coronary artery ostium and passed downstream into left anterior descending artery (Figure 5).

The extended guiding system was then tracked over the coronary guidewire and engaged into the left main coronary artery ostium. Selective angiogram confirmed a significant stenosis over the proximal segment of LAD, which was pre-dilated by 2.5 mm by 15 mm Sprinter Legend balloon (Medtronic) and stented by 4.0 mm by 18 mm Resolute Integrity drug eluting coronary stent (Medtronic) (Figure 6). The patient was discharged with stable condition on the next day after the procedure. We planned to arrange thallium scan to assess the functional significance of the chronic total occlusion over the right coronary artery in order to decide the need of further intervention.

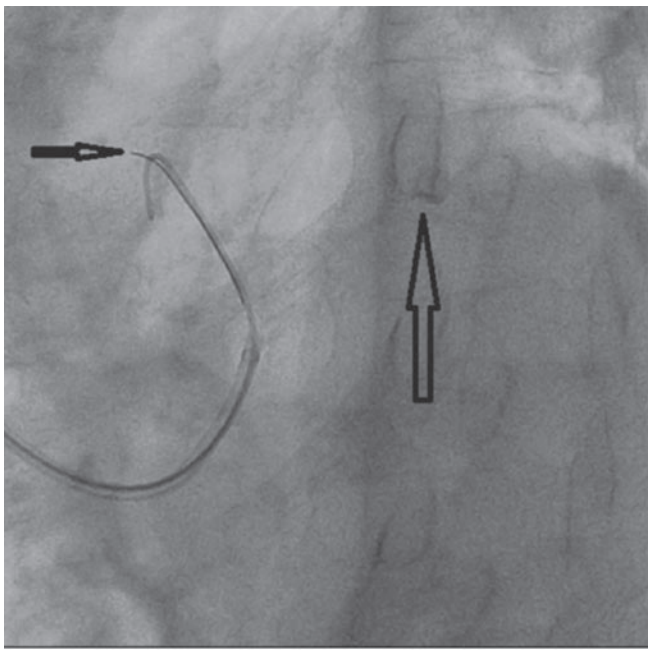

Figure 3. *Unsuccessful wiring (small arrow) of the left main coronary artery (big arrow) by 7Fr EBU 4.5 guiding catheter with the J-tipped 0.035 inch wire in-situ which served to change the configuration of guide catheter.*

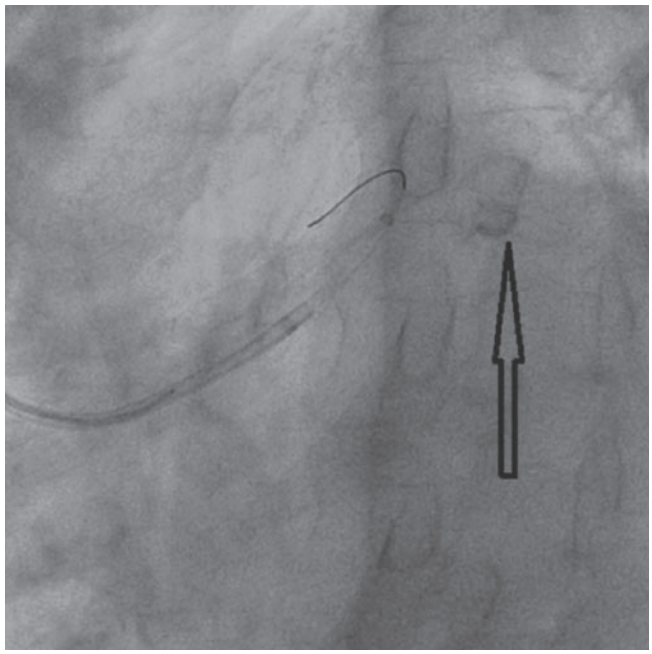

Figure 4. *The guiding system was extended by 7 Fr GuideLiner catheter but wiring of the left main coronary artery (straight arrow) was still difficult.*

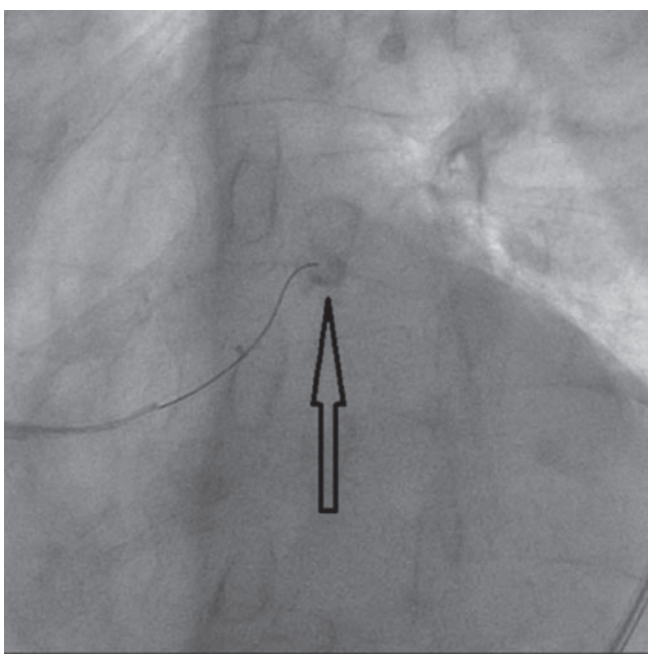

Figure 5. *Successful wiring of the left main coronary artery ostium (straight arrow).*

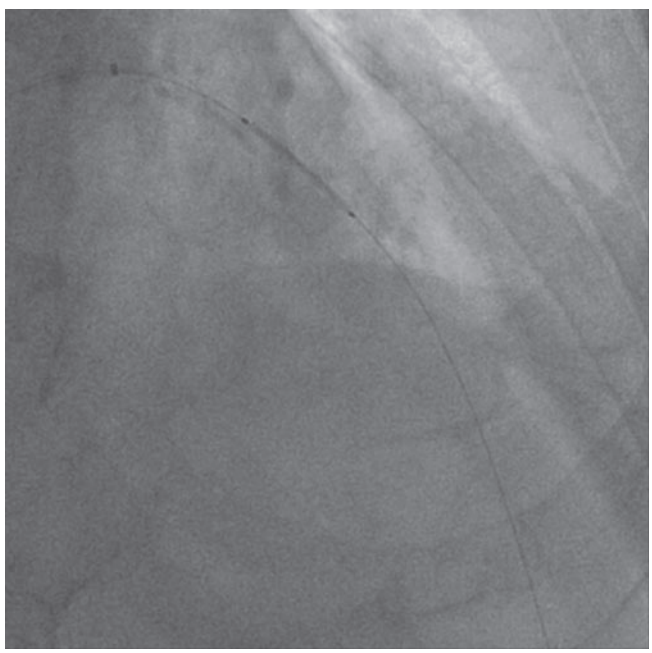

Figure 6. *Positioning of stent over the proximal segment of left anterior descending artery.*

Discussion

This patient presented with NSTEMI and 12 lead electrocardiogram revealed myocardial ischemia over the territory supplied by left anterior descending artery (ST segment depression over V3-6). Apparently there was an obstructive lesion over the proximal segment of left anterior descending artery during non-selective contrast injection over the coronary sinus. Therefore percutaneous coronary intervention was warranted for this patient who refused open heart surgery.

In dealing with difficult cannulations of coronary ostia, if both diagnostic and guiding catheters were failed, wiring by coronary wire through an unengaged guiding catheter could be first considered. However, such maneuver could be unsuccessful in patients with dilated root because of the long distance between the catheter tip and the coronary ostia. In such case, telescopic technique[1] can be a solution.

Previously described telescopic techniques included both "four-in-six" system and "five-in-six" system. The "four-in-six" approach utilizes a 4Fr, 125 cm Multipurpose diagnostic catheter (Cordis) inside the 6Fr guide catheter. Whereas the "five-in-six" approach utilizes a 5Fr Heartrail catheter (Terumo) inside the 6Fr guide catheter.[2]

The GuideLiner catheter (Innotronik) is a co-axial guiding catheter extension delivered through a standard guiding catheter on a monorail system. It comprises of a 20 cm polytetrafluoroethylene extension whose inner diameter is 1 Fr size smaller than the guide catheter. The main use of this catheter is to deliver stents in tortuous coronary lesions by deep engagement and providing better support.[3]

When GuideLiner catheter is used to facilitate engagement of coronary ostium, it has an advantage over the traditional telescoping catheter approach. Stent delivery is possible with a 6Fr Guideliner catheter left in-situ within a 6Fr guide catheter, but such strategy is not possible with a 4 or 5Fr diagnostic catheter which is inserted in a 6Fr guide catheter.

Roth et al. had described a case of successful left main coronary artery ostium after guide system extension by GuideLiner catheter in a patient with dilated aortic root.[4] However, in our case we still failed with this approach alone. Anchoring of the left main coronary artery was only successful when this approach was combined with manipulation of a coronary guidewire into the left coronary artery through the unengaged guiding system. Furuichi et al. has reported a case using coronary guidewire with the aid of telescopic catheter to achieve successful cannulation and intervention of a right coronary artery with anterior take-off.[5] However, to our understanding the present case is the first report employing Guideliner catheter and coronary guidewire to accomplish cannulation of left main coronary artery in a patient with dilated aortic root. This technique has the advantage of allowing successful intervention without the need of removing a telescopic catheter.

Conclusion

Engagement of left main coronary artery ostium could be difficult in patients with dilated aortic root. In cases of failed cannulation by conventional methods, use of extended guiding system with GuideLiner catheter together with anchoring of a coronary guidewire into the coronary ostium can bring success to reach this unreachable coronary artery.

References

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2. Anantharaman R, Obaid D, Chase A. Telescoping catheter technique for enlarged aortas. Catheter Cardiovasc Interv 2009;74:1126-8.
3. Kumar S, Gorog DA, Secco GG, Di Mario C, Kukreja N. The GuideLiner "child" catheter for percutaneous coronary intervention - early clinical experience. J Invasive Cardiol 2010;22:495-8.
4. Roth GA, Dean LS, Don CW. Rapid-exchange guide catheter extension for extending the reach of an AL3 guide in a patient with a long, dilated ascending aorta. Catheter Cardiovasc Interv 2012;80:1218-20.
5. Furuichi S, Sangiorgi, GM, Colombo A. Coaxial double catheter technique followed by buddy wire placement for ostial lesion of right coronary artery with anterior take-off. Cathet Cardiovasc Intervent 2007;70:979-82.

Hong Kong College of Cardiology

Twenty-Fourth Annual Scientific Congress

10 - 12 June 2016
Sheraton Hong Kong Hotel and Towers
Hong Kong

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Scientific Programme

Friday, 10 June 2016

0800	3/F of Tang Terrace	Registration	
0900-1030	**Ching Room, 4/F**	**Free Paper Session** Ischemic Heart Disease Percutaneous Coronary Intervention Infective Endocarditis	
	Ming II Room, 4/F	Congenital and Structural Heart Diseases	
1030-1100	4/F of Sung Terrace	Coffee Break & Visit Exhibits	
1100-1300	**Ching Room, 4/F**	**Free Paper Session** Cardiac Arrhythmia Cardiac Imaging Cardiac Surgery	
	Ming II Room, 4/F	Diabetes Mellitus, Hypertension and Cardiac Rehabilitation Miscellaneous	
1300-1430	Oyster Bar, 18/F	Lunch	
1430-1530	**Ballroom C, 3/F**	**Best Paper Oral Presentation**	
1530-1715	**Ballroom C, 3/F**	**Plenary Lectures**	
		Is Pharmacoinvasive a Bail-out Strategy for STEMI?	Ben He (PR China)
		New Insights of ECP Integrated Cardiovascular Rehabilitation	Gui-fu Wu (PR China)
		Comparison of STEMI Guidelines: Insights from China, Europe and the US	Wei-min Li (PR China)
		Case Sharing: Crusade Catheter Assistance for Antegrade Puncture by Retrograde Wire Guidance in Chronic Total Occlusion	Yeh-peng Chen (Taiwan)
		Case Sharing: Crusade Microcatheter-facilitated Reverse Wire Technique plus Anchor Ballon Technique for Coronarary Bifurcation Intervention	Hsin-fu Lee (Taiwan)
		Case Sharing: Rare Complication of NOAC	Man-cai Fong (Taiwan)
1715-1745	4/F of Sung Terrace	Coffee Break & Visit Exhibits	
1745-1900	**Ballroom C, 3/F**	**Joint European Society of Cardiology / Hong Kong College of Cardiology / Macau Cardiology Association Symposium**	
		FFR/OCT/IVUS: Which One to Pick and When?	Fausto Pinto (Portugal)
		Streamlining the Current Day Practices of TAVI Procedures	Kam-tim Chan (Hong Kong)
		Primary PCI Experience in AMI	U-po Lam (Macau)
1900-1915	**Ballroom C, 3/F**	**Opening Ceremony**	
1915-2015	**Ballroom C, 3/F**	**Plenary Lectures**	
		The Year of Interventional Cardiology	Zhi-min Du (PR China)
		Left Atrial Appendage Closure: Single Center Data and Experience from Shanghai Tenth People's Hospital	Ya-wei Xu (PR China)
2015-2145	**Ballroom A&B, 3/F**	**Welcome Dinner**	

Saturday, 11 June 2016

0730	3/F of Tang Terrace	Registration
0800-1240	**Ballroom C, 3/F**	**Joined Symposium – Cross-straits Medicine Exchange Association / Hong Kong College of Cardiology** **Guideline and Practice: Clinical Case Based Conference (GAP-CCBC)** *(Presentation in English or Putonghua)*

Two Cases of Myocardial Infarction Induced by Coronary Artery Spasm Fuwai Hospital 中國醫學科學院阜外醫院	Xuan Zhang (PR China) 張璿
Drug-eluting Balloon (DEB) in Complicated Cases of PCI Taipei Veterans General Hospital 臺北榮民總醫院	Min-ji Charng (Taiwan) 常敏之
A Diagnostic Dilemma of Atrial Mass Peking University People's Hospital 北京大學人民醫院	Hui Ren (PR China) 仁暉
Catheter Aspiration as First Line Method in Treatment of No-Reflow during Coronary PCI Beijing Chaoyang Hospital 首都醫科大學附屬北京朝陽醫院心臟中心	Ji-fang He (PR China) 何冀芳
Normal Coronary? Fatal STEMI! Kwong Wah Hospital 廣華醫院	Jason KC Ko (Hong Kong) 高國進
Drug Eluting Balloon in CAD Cheng Hsin General Hospital 振興醫院	Hsu-lung Jen (Taiwan) 任勗龍
Step by Step Pretreatment of Before Stenting to Achieve Optimal Result of PCI for Calcified LM Bifurcation Guangdong General Hospital 廣東省人民醫院	Peng-cheng He (PR China) 何鵬程
A Case of Familial Atrial Standstill Shanghai Tenth People's Hospital 上海第十人民醫院	Wen-hui Peng (PR China) 彭文輝
Recurrent Angina in a Young Postpartum Female Patient Xiamen Heart Center 廈門心臟中心	Guo-sheng Xiao (PR China) 肖國勝
Polycythemia Vera in Re-infarction Case Conde S. Januário General Hospital 仁伯爵綜合醫院	Edmundo Patricio Lopes Lao (Macau) 劉百球
Seven Times Replacement of Permanent Cardiac Pacemaker in 33 years to Maintain Adequate Heart Rate People's Hospital of Yuxi City 玉溪市人民醫院	Ying-lu Hao (PR China) 郝應祿
Spontaneous Intracranial Hemorrhage and Antiplatelet Therapy: Does Efficacy of Ticagrelor Come with Increased Risk? Cheng Hsin General Hospital 振興醫院	Wen-pin Huang (Taiwan) 黃文彬
Acute Myocardial Infartion Complicated with Coronary Perforation? Beijing Chao-Yang Hospital 北京朝陽醫院燕達院區	Jia-wei Chen (PR China) 陳佳偉
A Severe and Repeated Acute Myocardial Infarction General Hospital of Ningxia Medical University 寧夏醫科大學總醫院	Hui Huang (PR China) 黃暉

Saturday, 11 June 2016

0930-1200	**Ballroom A&B, 3/F**	**Symposium for Allied Cardiovascular Health Professionals 2016: A Stepwise Guide to "Uncommon" Cardiac Procedures**	
		Implantation of Leadless Pacemaker	Kathy LF Lee (Hong Kong)
		Implantation of Subcutaneous Implantable Cardioverter Defibrillator (S - ICD)	Ngai-yin Chan (Hong Kong)
		Transcatheter Aortic Valve Implantation (TAVI)	Michael KY Lee (Hong Kong)
		Implantation of Left Atrial Appendage (LAA) Occluder	Boron CW Cheng (Hong Kong)
1240-1345	Oyster Bar & Sky Lounge, 18/F	Lunch	
1400-1500	**Ballroom, 3/F**	**8th Congregation**	
		Guest-of-Honor: Prof. Gabriel M. Leung Dean of the Li Ka Shing Faculty of Medicine The University of Hong Kong	
1500-1600	**Ballroom, 3/F**	**AstraZeneca Symposium**	
		Updates on DAPT and Lipid Management – What are the Insights from the New Guidelines and Studies?	Chung-seung Chiang (Hong Kong)
1600-1700	**Ballroom, 3/F**	**Daiichi Sankyo Symposium**	
		Stroke Prevention in AF 2016: Update on Newer Drugs and Practical Tips on Patient and Drug Selection	Carlos Morillo (Canada)
1700-1900	**Ballroom, 3/F**	**Plenary Lectures**	
		Cholesterol Never Sleeps	Vincent OH Kwok (Hong Kong)
		Can We Predict the Response to Anti-hypertensive Therapy?	Brian Tomlinson (Hong Kong)
		Update on the Management of Chronic Stable Angina	José Luis Lopez-Sendon (Spain)
		Increased Safety with Reduced DAPT, Using Combo before TAVR	Pieter Stella (Holland)
1915-2030	**Ballroom C, 3/F**	**Hong Kong Heart Foundation Lectures**	
		Long-term Follow up of BRS – Xinsorb	Jun-bo Ge (PR China)
		The Complete Interventional Cardiologist: From PCI, Statin/DAPT & Mobile Heart	Alan CY Yeung (USA)
2030-2200	**Ballroom A&B, 3/F**	**Dinner**	

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

Sunday, 12 June 2016

0800	3/F of Tang Terrace	Registration	
0830-1030	**Ballroom C, 3/F**	**PCI Cases Discussion** **Prize Presentation**	
1030-1100	4/F of Sung Terrace	Coffee Break & Visit Exhibits	
1100-1200	**Ballroom C, 3/F**	**Actelion Pulmonary Arterial Hypertension (PAH) Symposium**	
		Advance in the Management of PAH	Colin Church (UK)
1200-1350	**Ballroom C, 3/F**	**Plenary Lectures**	
		Simplify the Challenge with Resolute Onyx in Complex Cases	
		- Complex All in One – ISR CTO & Bifurcation	Frankie CC Tam (Hong Kong)
		- Double Bifurcation PCI	Ka-chun Chan (Hong Kong)
		- The Convenience of the New Design	Karl CY Chan (Hong Kong)
		Intracranial Haemorrhage Associated with Anti-thrombotic Treatment	Lawrence KS Wong (Hong Kong)
		Recent Advances in the Treatment of Congestive Heart Failure	Michel Komajda (France)
		TAVI at the Moment and in the Future	Wei-hsian Yin (Taiwan)
1350-1500	Ballroom A&B, 3/F	Lunch	
1500-1630	**Ballroom C, 3/F**	**Plenary Lectures**	
		Absorb BVS: Clinical Update	Krishna Sudhir (USA)
		EMPA-REG OUTCOME – Getting to the Heart of Diabetes	David CW Siu (Hong Kong)
		Use of NOAC in Different Clinical NVAF Patient Subgroups – Elderly, Chronic Kidney Disease and Valvular Heart Disease	Steve WK Lai (Hong Kong)
1630-1700	4/F of Sung Terrace	Coffee Break & Visit Exhibits	
1700-1830	**Ching Room, 4/F**	**Joint APHRS and HKCC Scientific Symposium: Exercise and Sudden Cardiac Death**	
		An Update on Sudden Cardiac Death Prevention and Management in the Young Population	Wee-siong Teo (Singapore)
		Controversy on Pre-participation Athlete Screening for Cardiovascular Disease	Hung-fat Tse (Hong Kong)
		Cardiac Screening: Differentiating Athletes' Hearts from Cardiomyopathies	John Somauroo (UK)
		Sudden Cardiac Death-safe Country – Experience from Japan	Yoshinori Kobayashi (Japan)
1830-2000	**Sung Room, 4/F**	**Farewell Dinner**	

Paediatric Cardiology Symposium Programme

Saturday, 11 June 2016

0830-0835	**Ching Room, 4/F**	**Welcome Address**	Adolphus KT Chau (Hong Kong)
0835-1030	**Ching Room, 4/F**	**Paediatric Cardiology Symposium I**	
		Heart Failure in Adult Congenital Heart Diseases: Assessment and Management	Michael A. Gatzoulis (UK)
		Management of Fontan Failure	Timmy WK Au (Hong Kong)
		Palliative Care in Grown-up Congenital Heart – Novelty or Challenge?	Pak-cheong Chow (Hong Kong)
		Current Status of Transcatheter Closure of Perimembranous VSD in China	Zhi-wei Zhang (PR China)
		Transcatheter Closure of Perimembranous VSD: Long Term Results	Fen Li (PR China)
1030-1100	4/F of Sung Terrace	Coffee Break & Visit Exhibits	
1100-1230	**Ching Room, 4/F**	**Free Paper Session** **Paediatric Cardiology I**	
1240-1345	Oyster Bar & Sky Lounge, 18/F	Lunch	
1400-1500	**Ballroom, 3/F**	**8th Congregation**	
1500-1630	**Ching Room, 4/F**	**Paediatric Cardiology Symposium II**	
		Pulmonary Valve Replacement in Patients with Repaired Tetralogy of Fallot: Timing and Modalities [Surgical vs Percutaneous]	Michael A. Gatzoulis (UK)
		Cardiac Dysfunction in Childhood Cancer Survivors	Yiu-fai Cheung (Hong Kong)
		Interventional Catheterization of Congenital Coronary Artery Fistula in Pediatric Patients	Hui-sheng Wang (PR China)
		Clinical Profile and Outcomes of Tachycardia-induced Cardiomyopathy in Children	Lin Wu (PR China)
1630-1800	**Ching Room, 4/F**	**Free Paper Session** **Paediatric Cardiology II**	

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

ABSTRACTS

Abstracts for Free Paper Session:

ISCHEMIC HEART DISEASE

In-hospital Management and Outcomes of Patients Hospitalized with Acute Coronary Syndrome

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Purpose: Acute coronary syndrome (ACS) represents a heterogeneous spectrum of conditions. This study aimed to evaluate baseline characteristics, in-hospital management and outcomes in patients hospitalized with ACS.
Methods: We retrospectively analysed 5,987 consecutive patients admitted with ACS between August 2010 and July 2015 to 3 hospitals in the Hong Kong New Territories East Cluster. Data were collected by using the electronic medical records of the Clinical Data Analysis and Reporting System of the Hospital Authority. Multivariate logistic regression was performed to identify independent predictors of in-hospital mortality.
Results: Of 5,987 patients, 29.8% had ST-segment elevation myocardial infarction (STEMI), 70.2% had non-ST-segment elevation ACS (NSTEACS). Overall, 62.0% were ≥65 years old, 65.4% male and 21.7% had diabetes. Percutaneous coronary intervention (PCI) and coronary artery bypass surgery were performed during index hospitalization in 73.7% and 0.3% STEMI and 53.2% and 1.0% NSTEACS patients, respectively. On discharge, dual-antiplatelet therapy (clopidogrel 88.9%, prasugrel 3.2% and ticagrelor 7.8%) was prescribed in 78.3% and 54.4% and statins (simvastatin 84.1%, atorvastatin 8.4% and rosuvastatin 7.5%) in 84.6% and 76.9% of patients with STEMI and NSTEACS, respectively. Low, moderate and high intensity statins were prescribed on discharge in 17.2%, 69.8% and 13.0% of STEMI and 32.1%, 61.3% and 6.6% of NSTEACS patients, respectively. In-hospital mortality rates were higher among patients with STEMI than NSTEACS (overall 11.0%; STEMI 14.6% vs. NSTEACS 9.5%; p<0.01). Independent predictors of in-hospital mortality included age ≥65 years old (Odds Ratio (OR), 2.79; 95% CI, 2.09 to 3.72; p<0.01), STEMI (OR, 3.42; 95% CI, 2.72 to 4.29; p<0.01), no PCI during index hospitalization (OR, 4.45; 95% CI, 3.37 to 5.87; p<0.01), and no statins during hospitalization (OR, 23.65, 95% CI, 17.23 to 32.45, p<0.01).
Conclusions: This study demonstrated discordance between existing guidelines for ACS and current practice in Hong Kong. Early revascularization and prescription of statin before hospital discharge were strong predictors of in-hospital survival.

Twelve-month Clinical Outcomes in Patients with Acute Coronary Syndrome after Hospital Discharge

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[1]Department of Medicine & Therapeutics, The Chinese University of Hong Kong; [2]North District Hospital; [3]Alice Ho Miu Ling Nethersole Hospital, Hong Kong

Purpose: There is a paucity of data about the post-discharge outcomes and contemporary management practices of patients with an acute coronary syndrome (ACS) in Hong Kong. This study aimed to evaluate 12-month all-cause mortality and major adverse cardiac events (MACE) in ACS patients.
Methods: We retrospectively analysed 4,405 consecutive patients admitted and discharged with ACS between August 2010 and July 2014 to 3 hospitals in the Hong Kong New Territory East Cluster using the electronic medical records of the Clinical Data Analysis and Reporting System of the Hospital Authority. Multivariate Cox regression was performed to identify independent predictors of MACE.
Results: Of 4,405 patients, 1,242 (28.2%) patients had ST-segment elevation myocardial infarction (STEMI) and 3,163 (71.8%) patients had non-ST-segment elevation ACS (NSTEACS). Overall, 12-month post-discharge mortality rate was 14.3%; 10.0% in patients with STEMI and 16.0% in patients with NSTEACS. Rate of recurrent ACS was 9.4% during 12-month follow-up; 5.2% and 11.0% in patients with STEMI and NSTEACS respectively. Dual-antiplatelet therapy was prescribed in 22.6% (clopidogrel 87.5%, prasugrel 5.1%, and ticagrelor 7.4%) and statin in 74.8% (simvastatin 81.2%, atorvastatin 8.4%, and rosuvastatin 10.3%) of patients at 12-month follow-up. Independent predictors of 12-month MACE included age ≥65 years old (OR, 2.74; 95% CI, 2.23 to 3.36; p<0.01), diabetes mellitus (OR, 1.26; 95% CI, 1.06 to 1.48; p=0.01), no DAPT upon discharge (OR, 1.93; 95% CI, 1.63 to 2.27; p<0.01), no DAPT at 12 months (OR, 1.48; 95% CI, 1.14 to 1.92; p<0.01), statin therapy on admission (OR, 1.38; 95% CI, 1.17 to 1.62; p<0.01), and no statins at 12 months (OR, 1.20; 95% CI, 1.01 to 1.43; p<0.01).
Conclusions: Our results demonstrated that a considerable proportion of ACS patients discharged from hospital remained at increased risk for adverse outcomes. These data suggest the need for better long-term medical management and more intense follow-up of patients with ACS to improve their long-term outlook.

ABSTRACTS

Abstracts for Free Paper Session:

ISCHEMIC HEART DISEASE

Intermediate Lesions Prone to Progression and Revascularization: PSCD Risk Score System and Therapy Strategies

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Background: Effective early identification of which intermediate lesions will be a candidate for revascularization over time, is of paramount importance, providing the opportunity to implement therapy and prevention strategies.
Methods: The study population comprised of 465 patients with 519 intermediate lesions who underwent angiography on initial admission and angiographic follow-up ((11.02±5.84) months). According to whether these intermediate lesions received a necessary revascularization or not during the follow-up, the patients were classified into Revascularization group (162 of 182 lesions in 156 patients) and No revascularization group (337 lesions in 309 patients). Risk factors for revascularization of these intermediate lesions were analyzed.
Results: Multivariate analysis of the risk factors of future revascularization of intermediate lesions showed that type 2 diabetes (*OR*=1.616, 95% *CI* 1.058-2.470, *P*=0.026), no use of statins (*OR*=3.355, 95% *CI* 1.455-7.740, *P*=0.005), complex lesions (*OR*=2.743, 95% *CI* 1.805-4.168, *P*<0.001) and proximal lesions (*OR*=1.635, 95% *CI* 1.056-2.533, *P*=0.028) were independent predictors. PSCD risk score was established and analyzed.
Conclusions: Intermediate lesions with high PSCD risk score, should be considered for receiving more aggressive treatments involves coronary revascularization.

Population Attributable Risks of Modifiable Risk Factors Incorporating lipoprotein (a) and Low Serum Albumin Concentrations for First Incident Acute Myocardial Infarction in Chinese Han Ethnic Population: Cross-sectional Study of 1552 Cases and 6125 Controls

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Aims: Risk burdens of modifiable risk factors incorporating lipoprotein (a) (Lp(a)) and low serum albumin (LSA) concentrations for first incident acute myocardial infarction (AMI) haven't been studied simultaneously in Chinese Han ethnic population.
Methods: Cross-sectional study of 1552 cases and 6125 controls was performed for identifying the association of risk factors with first incident AMI and their corresponding population attributable risks (PAR).
Results: Modifiable risk factors incorporating LSA and Lp(a) accounted for up to 92% of PAR for first incident AMI. The effects of these risk factors are different in women and men, across different age categories. Overall, smoking and low serum albumin are the 2 strongest risk factors, together accounting for 64% of PAR for first incident AMI. After multivariable adjustment, Lp(a) and LSA have accounted for 19% and 41%, respectively, and together for more than a half (54%) of PAR for first incident AMI. Unexpectedly, hypertension is not significantly associated with first incident AMI.
Conclusions: Modifiable risk factors incorporating LSA and Lp(a) have accounted for an overwhelming large proportion of the risk of first incident AMI, indicating that most first incident AMI is preventable. Risk factor intervention strategies should be tailed for different populations. The knowledge of risk burdens for CAD in terms of Lp(a) and LSA concentrations may further reduce first incident AMI in Chinese Han population from a new angle.

Association between Serum 25-hydroxyvitamin D and Carotid Atherosclerotic Plaque in Chinese Type 2 Diabetic Patients

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Objective: The purpose of this study was to investigate the distribution of vitamin D status and the association between vitamin D and carotid atherosclerotic plaque (CP) in Chinese type 2 diabetic patients.
Methods: The cross-sectional study was performed among 210 type 2 diabetic patients and 94 non-diabetic patients which are age- and gender-matched during the winter months. Serum 25-hydroxyvitamin D [25(OH)D] was examined in both diabetic and controls. B-mode ultrasonography of carotid arteries was measured in type 2 diabetic patients.
Results: The concentration of 25(OH)D was 26.25(16.78-48.60) nmol/l among diabetic patients. 93.3% diabetic patients were suffering from hypovitaminosis D (76.67% for deficiency and 16.67% for sufficiency). We confirmed a clear negative association between the concentration of 25(OH)D and CP in type 2 diabetic patients (p<0.001). Meanwhile, the significant association between 25(OH)D and macrovascular disease was observed (p=0.005). In multivariate logistic regression analysis, decreasing concentration of 25(OH)D was found to be remarkably associated with CP in type 2 diabetic patients, as well as old age (OR: 2.533, p=0.013), smoking (OR: 3.872, p=0.001) and high level of LDL-c (OR: 2.776, p=0.009), after adjusting for the confounding factors.
Conclusion: A high prevalence of hypovitaminosis D exists in Chinese type 2 diabetic patients. Low concentration of 25(OH)D is remarkably associated with the presence of CP in diabetics. Besides, smoking, high level of BMI and LDL-c are also substantially positive predictors of CP in type 2 diabetic patients.

ABSTRACTS

Abstracts for Free Paper Session:

PERCUTANEOUS CORONARY INTERVENTION

Bioresorbable Scaffold in Primary PCI through Transradial Approach in a Bangladeshi Diabetic Population, a Single Center Single Operator Study

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Aims: Bioresorbable scaffold (Everolimus eluting) has some unique property and its feasibility and compatibility specially in lesions causing acute ST elevation MI is still an "under test" issue. In our relatively smaller study, we have evaluated the procedural and 3 months follow up of the patients undergoing PCI for acute STEMI through radial approach.
Methods: This is a single centre single operator prospective study since February 2013 to January 2015. The patients with diabetes mellitus presented with acute STEMI undergoing primary PCI were included. Target vessel revascularization was done through left Radial approach by BVS implantation. Primary endpoint was procedural success and angiographic TIMI flow. Secondary endpoint was MACE or death within 3 months follow up. No periprocedural IVUS or OCT imaging was done.
Results: Total 23 patients with DM were included in this period of study. Sixteen (69.5%) were male and the rest 7 patients were female. Mean age was 59±4.5 yrs. Out of 23, 19 patients (82.5%) were presented with acute anterolateral STEMI. Angiographically TIMI 0 flow was observed in 5 patients. The rest 18 patients had TIMI I flow before PPCI. Four (17.5%) patients were presented with Inferior MI. Target vessel revascularization was done by deployment of BVS in LAD = 16 (69.5), LCx = 4 (17.3%) and RCA = 3 (13.2%). Mean BVS diameter was 2.76±0.2 mm and mean stent length was 23.2±2.5 mm. One patient with triple vessel disease was expired during procedure while doing PCI to dominant LCx as the target vessel. Procedural success with TIMI III flow was 95.6%. After 3 months follow up, no MACE or death were recorded.
Conclusions: As it is a single operator study, the feasibility of using BVS in STEMI patients was uniformly and homogeneously judged and proved to be well feasible. The experience of using BVS in primary PCI was rather soothing as edge response was quite comfortable for the operator.

Duration of Dual Antiplatelet Therapy after Drug-eluting Stent Implantation: Meta-Analysis of Randomized Controlled Trials

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Purpose: Patients are recommended for 6-12 months' dual antiplatelet therapy (DAPT) after drug-eluting stents (DES) implantation. The optimal duration of DAPT which could make the most of clinical benefits while diminishing related risks has always been debated. Previous meta-analyses comparing short-term (<12 months) and extended durations (>12 months) of DAPT showed no significant benefit for longer duration treatment but a significant increase in the risk of bleeding. With the latest evidence, the optimal duration of DAPT needs to be re-examined to guide clinical practice. We performed a meta-analysis of randomized controlled trials to assess the risks and benefits of diverse DAPT durations after DES implantation.
Methods: We performed literature search using MEDLINE, Scopus, EMBASE, ISI Web of Science, Cochrane Library, ClinicalTrials.gov and recent conference proceedings, and included those trials randomizing patients to receive different durations of DAPT after DES implantation and reporting frequency of cardiovascular and bleeding events. Statistical analysis was performed using RevMan 5.3.4. Heterogeneity was calculated using I2 statistics; bias in the selection or publication of studies was assessed.
Results: Eleven randomized controlled trials with 33520 patients were included for analysis with 4 trials comparing extended DAPT vs. 12 months' regimen and 7 trials comparing short-term DAPT vs. 12 months' regimen. Compared to 12 months' DAPT treatment, extended DAPT significantly reduced the frequency of myocardial infarctions (OR 0.54 95%CI: 0.43-0.66; p<0.00001) and stent thrombosis (OR 0.36 95%CI: 0.24-0.55; p<0.00001), but the risks of major bleeding (OR 1.54 95%CI 1.22-1.96) and all-cause mortality (OR 1.43 95%CI 1.14-1.81) were substantially increased. There was no significant difference in preventing stroke, cardiac mortality and repeat revascularization. Compared to short-term DAPT, 12-month DAPT was associated with increased major bleeds (OR 1.98 95%CI: 1.26-3.11). However, no significant difference was found in the risk of other primary outcomes.
Conclusion: 12-month DAPT appears to be a reasonable compromise between preventing stent thrombosis and increasing bleeding risk. Our meta-analysis included both the largest DAPT trial and the most recent OPTIDUAL trial yielded new conclusions. Extending DAPT beyond 12 month shows benefits in reducing myocardial infarction and stent thrombosis, but with a concurrent increase in major bleeding and all-cause, although not cardiovascular, mortality. Discontinuation of DAPT before 12 months decreases the number of major bleeds with no apparent difference in other primary endpoints. In practice, this means that patients vulnerable to bleeding can have a short duration of DAPT but for those who are not at risk of bleeding, extended DAPT beyond 12 months can be considered.

ABSTRACTS

Abstracts for Free Paper Session:

PERCUTANEOUS CORONARY INTERVENTION

Long-term Clinical Outcome after Percutaneous Coronary Intervention with Ticagrelor or Clopidogrel in Patients with Acute Coronary Syndrome

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Purpose: We aim to compare long-term clinical outcomes among acute coronary syndrome (ACS) patients who underwent percutaneous coronary intervention (PCI) using ticagrelor versus clopidogrel.

Methods: We retrospectively analysed 1,336 consecutive ACS patients who underwent in-hospital PCI with drug-eluting stent (DES) implantation between August 2010 and July 2014 to 3 hospitals in the Hong Kong New Territory East Cluster using the electronic medical records of the Clinical Data Analysis and Reporting System of the Hospital Authority. The primary outcome was major adverse events (MACE) at 24 months. Univariate Kaplan-Meier analyses were performed for incidence of outcomes and multivariate Cox analysis was performed to identify independent predictor of MACE.

Results: Clopidogrel and ticagrelor were used in 1,235 (92.4%) and 101 (7.6%) patients. From 2010-2014, there was a trend towards ticagrelor from 5.1% to 16.9% by the end of the period. Patients treated with ticagrelor were more likely to present with ST-elevation myocardial infarction (STEMI) and younger. Unadjusted 24-month mortality (4.2% vs. 1.0%, p=0.17), recurrent ACS (6.6% vs. 1.0%, p=0.03) and MACE (9.8% vs. 2.0%, p=0.01) were higher in patients who received clopidogrel compared to ticagrelor. After adjustment, ticagrelor remained an independent predictor of MACE free survival (Adjusted Hazard Ratio (AHR), 0.19, 95% CI 0.04 to 0.97, p=0.05).

Conclusions: Ticagrelor is increasingly used in ACS patients who underwent early revascularization. Although antiplatelet therapy should still be individualized based on the thrombotic and bleeding risk, our study highlights the safety of the new P2Y12 inhibitors in contemporary Hong Kong practice.

ABSTRACTS

Abstracts for Free Paper Session:

INFECTIVE ENDOCARDITIS

Clinical Analysis of 25 Patients with Infective Endocarditis but without Structural Heart Disease

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Objective: To analyze the latest 5 years young patients with clinical symptoms, laboratory tests, etiological examination, echocardiography, complications, surgical treatment and prognosis, which had no structural heart disease, and summarize the experience of treatment for this kind of infective endocarditis.
Method: Retrospective analysis was performed on the patient without structural heart disease in hospital from January 2010 to October 2015, including their clinical features, surgical outcome and prognosis.
Result: 25 cases were collected, accounting for 22.12% of the infective endocarditis patients (25/113), including 13 male and 12 female, the age from 10 months to 18 years old. The main clinical manifestations were fever (22, 88%), heart murmur (23, 92%). Left ventricular endocardial vegetation was detected by echocardiography in all, and 2 combined with tricuspid valve vegetation. Heart failure is the most common complications (68%), followed by embolic events (24%), and then splenomegaly (8%). Streptococcus is the main pathogenic bacteria, followed by Staphylococcus aureus. Twenty-four cases were under surgical removal of vegetation and valve repair combined with active internal anti infection treatment. Twenty-three patients were cured (95%), except 1 patient with severe left heart failure, and died of low cardiac output syndrome after surgery (4.16%). The other one had so long duration that developed multiple systemic embolisms, multiple organ dysfunctions and died at last.
Conclusion: The incidence rate of Patients with infective endocarditis without structural heart disease is 22.12%, which should pay significance attention. This kind of infective endocarditis usually accompanied with left heart vegetation, which can result in heart failure and aggravate the patients' condition. So when the patient with infective endocarditis have operation indication, especially got left heart vegetation and heart failure ones, should give active medical anti infection treatment and be operated as soon as possible to get a better prognosis.

Infective Endocarditis in an Adult Female with Bicuspid Aortic Valve, Hypertrophic Cardiomyopathy and Amyopathic Dermatomyositis: A Case Report

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Purpose: Bicuspid aortic valve (BAV) and Hypertrophic cardiomyopathy (HCM) are rare congenital heart diseases with prevalence in the general population of 1% and 0.2% respectively. Connective Tissue Disease is a group known to have various cardiac involvements to which Amyopathic dermatomyositis belong.
Methods: We present a case of a 38-year-old female who came in with abdominal pain, fever, skin hyperpigmentation and systolic murmur that was diagnosed with splenic infarction secondary to Infective endocarditis.
Results: Transesophageal echocardiography revealed marked hypertrophy and a nonmobile vegetation in a bicuspid aortic valve. Cardiac MRI revealed asymmetric hypertrophy, marked LV wall thickness and Late Gadolinium Enhancement fibrosis typically seen in Hypertrophic cardiomyopathy.
Conclusion: This is the first reported case of an adult female with Infective endocarditis who presents with Bicuspid aortic valve, Hypertrophic cardiomyopathy and Amyopathic dermatomyositis. We want to point out the potential benefits of Cardiac MRI in establishing the diagnosis of patient's marked hypertrophy as solely due to Hypertrophic cardiomyopathy and not as a result of compensatory hypertrophy secondary to aortic stenosis. We highlight the unusual combination of Hypertrophic cardiomyopathy and dermatomyositis and the utility of Cardiac MRI in the definite diagnosis of HCM with concomitant BAV.

ABSTRACTS

Abstracts for Free Paper Session:

CONGENITAL & STRUCTURAL HEART DISEASE

Novel and Functional DNA Sequence Variants in the TBX5 Gene in Patients with Sporadic and Isolated Ventricular Septal Defect

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Purpose: Ventricular septal defect (VSD) is the most frequently occurring congenital heart disease (CHD) in newborns. A number of genetic studies have linked TBX5 mutations to cardiac abnormalities. We aimed to identify potential pathogenic mutations in TBX5 and to provide insights into the etiology of isolated VSD.
Methods: Case-control mutational and functional analysis was performed in 354 sporadic patients with isolated VSD and 341 controls. All the coding exons and intron-exon boundaries of TBX5 were first sequenced in a group of VSD patients and controls. Sanger sequencing with high-resolution melting (HRM) curve analysis in new patients and controls was then used to detect TBX5 mutation and frequency. Luciferase activities were measured to identify transcriptional regulation of TBX5 to MYH6 promoter.
Results: A novel heterozygous missense mutations (c.40C>A) was identified in TBX5 gene exon-2. This mutation leads to proline to threonine substitution at position 14, which is highly conserved among many species. TBX5 containing mutation displayed less transcriptional activation of the MYH6 promoter compared to wild type.
Conclusions: We identified a novel heterozygous missense mutation in TBX5 gene exon-2 in sporadic and isolated VSD patients suggesting heterogeneous nature of the sporadic VSD and the important role of HRM as a reliable and efficient method to determine disease-related gene mutation in CHD. The functional analysis suggests that mutation may increase the susceptibility to the development of VSD as a risk factor.

Risk Factors and Nursing Strategies of Transcatheter Interventional Therapy for Congenital Heart Diseases based on Big Data Analyses

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Purposes: Based on big data analyses, we discuss the risk factors of transcatheter interventional therapy for congenital heart diseases, then develop nursing strategies.
Methods: A total of 4096 patients who accepted transcatheter interventional therapy between January 2011 and December 2015 were analyzed retrospectively. Of these cases, 226 with severe pulmonary stenosis, 1389 with ventricular septal defect, 1170 with atrial septal defect, and 1133 with patent ductus arteriosus. All personal information and perioperative period data, including cardiac function, level of blood oxygen saturation, blood gas analysis, operative time, puncture site, time for palinesthesia, time for ECG monitoring, time for mechanical ventilation and complications were obtained and classified according to risk stratification. Then, univariate and multivariate logistic regression analyses were performed.
Results: The success rate for transcatheter interventional therapy is 98.7%. Univariate logistic regression analysis identified age, weight, cardiac function, level of blood oxygen saturation, pH, time of operation, vessel puncture, time for palinesthesia, time for ECG monitoring, time for mechanical ventilation as significant risk factors of complications ($p<0.05$). While in multivariate logistic regression analysis, weight, time of operation, degree of cyanosis, diameter of defect, distance to aortic valve, pulmonary artery hypertension are identified as significant risk factors of complications ($p<0.05$). We, the nursing staff, should notice the unique risks of transcatheter interventional therapy and develop early stage nursing management for these perioperative risk factors.
Conclusions: Transcatheter interventional therapy is safe and effective. Key point to assure a good postoperative recovery and to successful therapy is that nursing staff should be aware of the risk factors of perioperative period of transcatheter interventional therapy, the significant risk factors of complications and the influences of operation and recovery, and plan an early stage nursing intervention in advance.

ABSTRACTS

Abstracts for Free Paper Session:

CONGENITAL & STRUCTURAL HEART DISEASE

Surgical Therapy: Does it Change Proteomic Profile in Congenital Heart Diseases?

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Purpose: In order to explore the surgical results at molecular basis in individuals, to understand possible changes of the proteomic pattern after surgical repair towards "Precision Medicine" in the postoperative rehabilitation and the long term outcome obviously is of significance. We designed the present study to compare the proteomic pattern in the pre- and post-operative period in tetralogy of Fallot (TOF) and ventricular septal defect (VSD) order to find the clinically important changes.
Methods: Differential protein analysis was performed in the plasma samples of patients with TOF or VSD preoperatively (n=15 in each group), 6-month postoperatively (n=15, in each group), and normal controls by using two-dimensional electrophoresis and mass spectrometry. Altered proteins that might be related to disease processes were further confirmed by enzyme-linked immunosorbent assay (ELISA) in the samples from new group of patients (n=26 in each group).
Results: In proteomic studies, a total of 473 protein spots in preoperative patients and 515 in postoperative patients were detected. Significantly ($p<0.01$ vs. control) downregulated (11 in preoperative and 15 in postoperative group) and upregulated (14 in preoperative and 7 in postoperative group) protein spots were detected. Further validation of the chosen proteins by ELASA in the new group of patients demonstrated that in VSD patients, postoperative Complement Component C3c (45945.6±1553.1 vs. 39591.3 ±1411.9 ng/ml, $p<0.05$) was partially and serum amyloid p-component (30.6 ±0.7 vs. 29.0±0.3 ng/ml, $p<0.05$) was completely recovered from the lower level preoperatively. In TOF patients, postoperative gelsolin (74115.3±13110.2 vs. 41897.4±2885.2 ng/ml, $p<0.05$) was partially and alpha-1-antitrypsin (8672602.0±525882.2 vs. 4532717.8±718371.5 nIU/ml, $p<0.01$) was completely recovered. In contrast, the elevated fibrinogen gamma chain level in preoperative patients (575046.0±27460.6 ng/ml, $p<0.01$ vs. control) became normal postoperatively (523043.1±18162.51 ng/ml, $p=0.1$ vs. control).
Conclusions: We have for the first time, by using proteomic methods with further validation, demonstrated that repair operations in CHD change the protein profiles and correct preoperative abnormal protein levels in the plasma. Owing to the fact that these proteins either function as acute phase proteins (serum amyloid p-component), play a central role in the complement system and contribute to innate immunity (complement component C3c), or play importance role in coagulation (gelsolin and fibrinogen gamma chain), our findings further demonstrate that intracardiac repair may restore the abnormal protein functions related to immune system and coagulation profile in CHD patients.

Initial Experience of a New ASD Closure Device in Hong Kong – Cocoon Septal Occluder

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Background: Percutaneous transcatheter closure with double disc occluder is the preferred method for the majority of patients with secundum atrial septal defect (ASD) currently. Despite high closure rate and few major complications, the current device has been rarely associated with lift-threatening aortic erosions and severe allergic reactions due to nickel leakage into blood stream. Compared to non-coated nickel containing occluders, the important properties of Cocoon Septal Occluder (CSO) are the nanoplatinum coating and its softness resulting predominantly from the removal of the oxide of Nitinol during its preparation process.
Objectives: The aim of this study was to examine the initial experience and results of usage of CSO in Chinese patients.
Methods: We conducted a retrospective review of consecutive 10 patients had ASD closure by CSO from August 2015 to March 2016 in Hong Kong.
Results: Ten Chinese patients (7 female, 3 male) received CSO for ASD closure with intra-cardiac echographic guidance, with median age 46.6 years (range 26-59 years). Nine of them just had single defect, and one was fenestrated ASD with three defects. All of the indication for closure was right heart volume overload. All of them had right heart catheterization before closure, and the shunt ratio before procedure was 2.78 (range 1.6-3.9 mmHg). Mean ASD diameter was 14.3 mm (range 8-24 mm), while the mean device diameter was 19.4 mm (range 12-30 mm). That fenestrated case received two 16 mm devices, while all other had one device only. All devices were successfully implanted without need of change to different device size in all patients. Echocardiographic examination immediately after the procedure and at the one-month follow-up showed complete closure of the defect in all patients. No any complication, or any adverse allergy reaction or mortality was observed during the procedure or at short term follow-up, mean 4 months (range 1-7 months).
Conclusion: This initial experience of CSO in Hong Kong indicated that this device is a reasonable and safe choice for percutaneous transcatheter closure of ASDs in Chinese patients. Moreover, CSO could also be used in fenestrated ASD closure. Further studies with longer follow up period in a larger patient size are necessary to show its efficacy and safety.

ABSTRACTS

Abstracts for Free Paper Session:

CONGENITAL & STRUCTURAL HEART DISEASE

Direct Aortic TAVI: Initial Experience in one TAVI Centre in Hong Kong

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Background: Majority of Transcatheter Aortic Valve Implantation (TAVI) for treatment of severe aortic stenosis (AS) were performed via femoral artery route with high success rate and low complication rate. Due to the presence of severe diseased femoral or iliac arteries in some TAVI candidates, alternative access routes are developed, including via subclavian or carotid arteries, left ventricular apex, and ascending aortic (i.e. direct aortic approach). In this study, we shared our initial experience and results of direct aortic (DA) approach for TAVI in Prince of Wales Hospital (PWH).
Methods and Results: Among all 22 TAVI performed in PWH between March 2015 and February 2016, three patients with symptomatic severe AS underwent the procedures via DA approach, with mean age 80 years old (range 77-82) and mean weight 51.3 kg (range 45-59.2). The mean STS score was 9.56%, and all patients were considered high-risk surgical candidates in the Heart Team meeting. The reason for direct aortic approach was all due to the small caliber of both femoral arteries in two patients, and one patient had severe descending aortic aneurysm. All procedures were performed under general anesthesia with transesophageal echocardiographic guidance in the hybrid operation theatre. Aortic valve area increased from 0.51 cm^2 (0.4-0.62 cm^2) to 1.8 cm^2 (1.4-2.3 cm^2) with mean pressure gradient improved from 64 mmHg (50-84 mmHg) to 9.5 mmHg (5.1-12.0 mmHg). No more than moderate paravalvular leak was detected. There was no patient requiring permanent pacemaker implantation, no stroke, and no conversion for full sternotomy. One patient complicated with acute kidney injury at post TAVI day two and required temporary hemodialysis for two days, and her kidney function returned to her baseline afterwards. The 30-day mortality was 0%. All three patients showed symptomatic improvement from NYHA class III to class I.
Conclusion: From this case series, direct aortic approach for TAVI is found to be feasible in small size Chinese patients with severe symptomatic aortic stenosis if transfemoral approach for TAVI is contraindicated.

Clinical Results of Catheter Based Percutaneous LAAO Procedure in Patients with Non-valvular Atrial Fibrillation – A Single Centre Experience

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Background: In patient with non-valvular atrial fibrillation (AF), majority of thrombus accumulation originates in the left atrial appendage (LAA). Long-term anticoagulant therapy has been the standard treatment. However, the associated bleeding risk is significant in certain patient groups especially elderly and those who experienced major bleeding events. Transcatheter based occlusion of left atrial appendage has proved to be non-inferior to warfarin in preventing stroke in non-valvular AF patients.
Objective: To evaluate clinical results of catheter based percutaneous LAAO in patient with non-valvular AF performed at Queen Elizabeth Hospital.
Methods: A retrospective review of all patient undergoing catheter based percutaneous LAAO procedure in Queen Elizabeth Hospital was performed. Parameters for registry of LAA occluders listed in EHRA/EAPCI consensus statement on LAA occlusion were collected and analyzed with SPSS 19.0.0.
Result: Since February 2013, percutaneous LAA occlusion was successfully performed in 40 patients. All procedures were performed under general anaesthesia (GA) and trans-esophageal echocardiography (TEE) guidance. The mean age was 73.0 (± 7.64) years. The mean CHA2DS2-VASc score was 4.15 while the mean HAS-BLED score was 2.88. Majority had permanent AF and more than half of them (55%) had history of intracranial hemorrhage. 28 patient received Watchman TM device and 12 received Amplatzer TM Cardiac Plug/Amulet TM device. The mean implant size was 28.1 mm. There were 2 patients received paracentesis for pericardial effusion and another 2 was treated conservatively. Other complications included 2 minor bleeding (wound hematoma and haematuria), 1 pneumothorax after GA and 1 acute renal failure. There was no device embolization, peri-procedural cerebral event nor death during hospital admission. On FU TEE, 12 patients had trivial leakage 1-2 mm detected. Two cases with Watchman device had leakage >3 mm while less than 5 mm. No device thrombus was detected. 30 days mortality and 1 year stroke rate was 0%.
Conclusion: Percutaneous LAA occlusion is a reasonable alternative to selected patient for stroke prevention in patients with non-valvular AF with increased stroke and bleeding risk/cannot tolerate oral anticoagulant. The success rate was comparable to the standard in literature.

ABSTRACTS

Abstracts for Free Paper Session:

CONGENITAL & STRUCTURAL HEART DISEASE

Transcatheter Aortic Valve Implantation (TAVI) in Patients with Severe Bicuspid Aortic Valve Stenosis

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Introduction: In recent years, Transcatheter Aortic Valve Implantation (TAVI) has been developed as alternative treatment for patients with symptomatic severe aortic stenosis who are deemed to be of high risks for conventional surgical aortic valve replacement (SAVR). Due to complex anatomy, patients with severe bicuspid aortic valve stenosis were excluded from randomized TAVI trials and the data of these patients undergoing TAVI were limited. The aim of this study was to evaluate the efficacy, safety and short-term clinical outcomes of patients with severe bicuspid aortic valve stenosis undergoing TAVI.

Method: Hospital records of all patients who had TAVI procedure from December 2010 to February 2016 in a local regional hospital were reviewed. The baseline characteristics, imaging findings (CT and Echocardiogram), procedural outcome and 30-day clinical outcome were analyzed.

Results: A total of 67 patients received TAVI procedure during the study period. Fifty-eight patients had tricuspid aortic valve stenosis, 8 patients had bicuspid aortic valve stenosis and one patient had severe aortic regurgitation. Among those who had bicuspid aortic valve stenosis, the mean age was 77.9 (±5.2), with 2 of them (25%) are female. The mean LVEF was 45.6% (±12.5%). All procedures were done under general anaesthesia in our cardiac catheterization laboratory with 100% procedural success. Aortic valve area improved from 0.64 (±0.20) to 1.98 (±0.54). Two patients (25%) had mild to moderate para-valvular leakage after procedure and only 1 patient (12.5%) had mild to moderate para-valvular leakage on subsequent follow-up echocardiogram. All patients reported symptomatic improvement on subsequent follow-up visit with improvement of NYHA class 1.0. One of these 8 patients had permanent pacemaker implanted (12.5%). The 30 days mortality was 0%.

Conclusions: In patients with severe bicuspid aortic valve stenosis who are deemed high risks of SAVR, TAVI is feasible and safe option with good short-term outcome.

Percutaneous Left Atrial Appendage Occlusion under Monitored Anesthetic Care: Single Centre One-year Experience in Hong Kong

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Background: Percutaneous left atrial appendage occlusion (LAAO) for stroke prevention in patients with atrial fibrillation (AF) is usually performed under general anaesthesia in many centres due to prolonged intubation of trans-esophageal echocardiographic (TEE) probe. With the support from the anaesthetists, our percutaneous LAA occlusion pragram was run regularly under the monitored anaesthetic care (MAC) without the need of endotracheal intubation.

Objective: The aim of this study was to share our experience and to evaluate the performance of the LAAO program.

Methods: In this study, we shared our experience and evaluated the performance of the LAAO program between January and December 2015 in Prince of Wales Hospital in Hong Kong.

Results: 44 patients (28 males and 16 females) received percutaneous LAAO under MAC session. The average age was 73.9 years old (range 60-84), and the mean CHA2DS2-VASc and HAS-BLED scores were 4.1 and 3.1 respectively. Twenty-five (57%) Watchman and 19 patients (43%) Amulet LAAO devices were implanted in all patients with mean procedural of 66.9 minutes and fluoroscopic time of 15.3 minutes. There were two (4.5%) minor complications as vascular access site hematoma, which were managed conservatively. There were two (4.5%) major complications as cardiac tamponade requiring urgent open heart repair, and both patients discharged home after 10 days and 30 days hospitalization. After excluding those two patients, the average length of hospital stay was 3.6 days (range 2-7 days). There was no any device embolization, stroke, systemic embolism, air embolism, aspiration pneumonia, or procedural related death.

Conclusion: Percutaneous LAAO under MAC is feasible and safe. Major complication is uncommon, and could be managed promptly even under MAC. LAAO under MAC might be a good alterative in patients for AF stroke prophylaxis.

ABSTRACTS

Abstracts for Free Paper Session:

CONGENITAL & STRUCTURAL HEART DISEASE

Transcatheter Structural Heart Intervention: One-year Experience in a Tertiary Hospital in Hong Kong in 2015

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Background: The development of percutaneous approaches for structural heart diseases has seen tremendous advances over the past decade. Increased recognition and understanding of those disease processes and related treatment options prompt to establishment of structural heart team in different overseas cardiac centres. We summarized and evaluated the one-year experience and results of transcatheter structural heart intervention in one tertiary hospital in Hong Kong.

Purpose: To provide better service to patients with structural heart diseases through a team approach.

Methods: A retrospectively review of all patients underwent transcatheter structural heart intervention between January to December 2015 in Prince of Wales Hospital was performed. Patients' demographics, clinical characteristics, operative procedures, postoperative complications and outcome were recorded and analyzed. Types of complication were classified as major and minor, with reference to the definition from VARC-2 consensus document.

Results: In 2015, there were 107 procedures of percutaneous transcatheter structural heart intervention performed. The average age was 66.3 years old (range 22-88), male and female patients were similar in proportion (48% vs. 52%). Among them, there were 47 cases (43.9%) of left atrial appendage occlusion, 18 cases (16.8%) of transcatheter aortic valve implantation, 18 cases (16.8%) of atrial septal defect closure, 11 cases (10.3%) of percutaneous transcatheter mitral commissurotomy, 3 cases (2.8%) of patent foreman ovale closure; and the remaining 10 cases (9.4%) included percutaneous mitral valve repair by MitraClip, patent ductus arteriosus closure, ventricular septal defect closure, balloon aortic valvuloplasty, pulmonary arterio-venous malformation occlusion, bilateral branch pulmonary artery stenting, coronary arterial fistula occlusion, paravalvular leakage closure. The procedural successful rate was 97.2%; Major and minor complication rates were 4.6% and 14.0% respectively. There was no procedural related death. The 30-day mortality was 1.9% (n=2), and the causes of death were pneumonia and septicemia. More than half of the procedures were transesophageal echocardiographic guidance (n=65, 60.7%), while 32 (29.9%) and 10 (9.3%) were under intracardiac echocardiographic and fluoroscopic guidance.

Conclusion: The percutaneous transcatheter intervention for structural heart disease includes a wide spectrum of cardiac problems. The team approach in this rapidly developed field of cardiology could provide better clinical care in term of safe, effective with high success rate.

ABSTRACTS

Abstracts for Free Paper Session:

CARDIAC ARRHYTHMIA

Bystander Cardiopulmonary Resuscitation Awareness and Automated External Defibrillator Distribution Survey in Hong Kong

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Purpose: We aim to study the knowledge of general public in bystander cardiopulmonary resuscitation (CPR)/defibrillation and the distribution of community automatic external defibrillators (AEDs) in Hong Kong.
Method: A telephone survey was conducted to assess the public awareness of the significance of bystander CPR and defibrillation. Respondents were questioned regarding their knowledge about bystander CPR and AEDs. The AED survey was conducted via written questionnaires sent to four major local AEDs providers. The total number and the geographical distribution of community AEDs were assessed.
Result: A total of 524 successful telephone interviews were conducted. Only 23% and 4.6% of the respondents had been trained in CPR and AEDs use respectively. Among the trained respondents, only 54% and 15% were willing to provide by-stander CPR and defibrillation respectively, in case of witnessed OHCA. This low motivation to offer bystander CPR/defibrillation was attributable to forgetfulness about CPR technique, lack of training/confidence, expiry of certificate, and reluctance to help strangers. There were 5084 AEDs installed in the community by April 2014. The community AEDs were installed in government offices (N=1423; 28%), non-government organizations (N=905; 18%), commercial buildings (N=649; 12.8%), schools (N=537; 10.6%), sports stadiums (N=401; 8%), housing estates (N=379; 7.5%), Mass Transit Railway stations (N=295; 5.8%), shopping malls (N=255; 5%), universities/colleges (N=162; 3.2%), theme parks (N=55; 1.1%), airport (N=12; 0.2%), piers (N=7; 0.14%), and racecourses (N=4; 0.08%). Only approximately 20% of AEDs (N=1029) were installed in publicly accessible areas, which translated into 14 publicly accessible AEDs per 100,000 population.
Conclusion: The public CPR/AEDs training rate and motivation to offer bystander CPR/defibrillation was low. The community AEDs installation rate and public accessibility was low. A community-wide program to improve bystander CPR/AED training rate and more strategic installation of community AEDs is required to improve bystander CPR/defibrillation rate.

Sudden Arrhythmia Death Syndromes in Young Victims of Sudden Cardiac Death in Hong Kong Identified by Clinical or Molecular Autopsy of Victims and Clinical Evaluation of Their First Degree Relatives (SADS-HK Study)

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Objectives: Sudden cardiac death (SCD) in young people is not uncommonly caused by inheritable arrhythmogenic disorders known as Sudden Arrhythmia Death Syndromes (SADS) in overseas studies. We sought to determine the prevalence and types of SADS underlying SCD among local young victims through clinical and molecular autopsy of SCD victims and clinical and genetic evaluation of their first degree relatives (FDR).
Methods: This is a prospective study. Young SCD victims (age 5-40 years) with either an inheritable arrhythmogenic cardiomyopathy or no structural heart disease identified on autopsy and a negative toxicology screening and their FDR will be recruited into study. Molecular autopsy of SCD victims is done by Next Generation Sequencing (NGS) to identify pathogenic mutation in 35 SADS-related genes. All recruited FDR will undergo clinical evaluation for SADS. Mutation-specific family screening will be performed if pathogenic mutation is found in probands.
Results: As of March 2016 seventeen SCD victims (M:F 13:4, mean age 26.5±7.4 years) and 46 FDR (M:F 24:22, mean age 41.0±16.6 years) were recruited into the study after 18 months of recruitment. Clinical autopsy found arrhythmogenic right ventricular cardiomyopathy (ARVC) in 2 and structurally normal heart in 15 SCD victims. Molecular autopsy was completed in 14 SCD victims. Pathogenic or likely pathogenic mutations in ***DSP***, ***DSC2***, ***AKAP9, MYBPC3 and RYR2*** genes, as defined by *in silico* analysis, were found in 6 SCD victims. These mutations were implicated in ARVC, ARVC, long QT syndrome, hypertrophic cardiomyopathy and catecholaminergic polymorphic VT (CPVT) respectively. 11 FDR were found to be asymptomatic carriers of known mutation of the probands. Among them only 1 with ***DSP*** mutation demonstrated phenotype of ARVC while the rest of them could not be identified by clinical evaluation due to absence of clinical phenotype.
Conclusions: This is the first local genetic and clinical study to identify SADS in young SCD victims and their FDR in Hong Kong. Preliminary data suggest that SADS are not uncommonly implicated in SCD among young victims. Molecular autopsy using NGS is able to characterize the pathogenic genetic defects in SADS victims and facilitate the identification of mutation carriers in their FDR which allows early preventive treatment to be initiated to reduce their risk of SCD.

ABSTRACTS

Abstracts for Free Paper Session:

CARDIAC ARRHYTHMIA

A Comparison of Mortality Rate with Cryoballoon and Radiofrequency Ablation for Atrial Fibrillation

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Purpose: Radiofrequency ablation is the current standard method for atrial fibrillation, while cryoballoon ablation is the emerging alternative. We try to evaluate the influence of cryoballoon and radiofrequency ablation on mortality.
Methods: In search of peer-reviewed articles from Medline, Embase and Cochrane database. We conducted the search from 2010 to 2016. Two independent reviewers reviewed the titles, abstracts and collected the data from studies that met the inclusion criteria. Conflicts between reviewers were resolved by consensus. Heterogeneity was analyzed with I^2. Pooled hazard ratio (HR) as the effect size and 95% confidence interval were used to estimate the association of cryoballoon and radiofrequency ablation in mortality by randomized effect model with M-H method.
Results: A total of 5 studies were included which fitted the inclusion criteria. In comparison with radiofrequency ablation group, the cryoballoon ablation group showed a pooled HR 0.92 with 95%CI 0.78-1.38, P=0.58.
Conclusion: Cryoballoon ablation is not associated with increased risk of mortality.

Excess Risk of Incident Atrial Fibrillation and Activated Vascular Repair Cascades among High-Risk Cardiac Patients with Selenium Deficiency

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Background: Selenium deficiency was associated with heart failure and accelerated atherosclerosis, but its role in atrial fibrillation (AF) was unknown.
Methods: We prospectively investigated 558 high-risk patients with prior coronary disease, ischemic stroke and/or type 2 diabetes in a clinical cohort. CD34+/KDR+ and CD133+/KDR+ circulating endothelial progenitor cells (EPC) were determined by flow cytometry. New-onset AF was ascertained from the computerized medical record system over a 5-year follow-up period. Selenium deficiency was defined as <22 mcg/day (from prior pilot study) as determined from a validated food frequency questionnaire.
Results: Over 63±11 months, 2% patients (9/558) developed new-onset AF. Selenium deficiency (prevalence 16%) was associated with increased risk of new-onset AF (chi-square P=0.001). C-statistic for prediction of AF by selenium deficiency was 0.70 (P=0.040). Kaplan-Meier analysis showed that selenium deficiency was associated with reduced AF event-free period (log-rank 17.7, P<0.001). Adjusted for potential confounders (age, gender, smoking, history of coronary disease/stroke, body-mass index, systolic/diastolic blood pressure, pulse rate, serum LDL, HDL and triglycerides, HbA1c, statin/aspirin use), selenium deficiency remained independently associated with increased risk of AF (HR 10.5 95%CI 1.1-99.0, P=0.041). Furthermore, selenium deficiency was associated with reduced CD34+/KDR+ EPC and raised CD133+/KDR+ EPC.
Conclusions: Selenium deficiency is associated with an excess risk of incident AF, as well as altered indicators of vascular repair activation which may provide an explanatory pathophysiological mechanism for the clinical events.

ABSTRACTS

Abstracts for Free Paper Session:

CARDIAC IMAGING

Variable Clinical Presentations of Left Atrial Myxoma in Malaysia: A Case Series

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Introduction and Purpose: Cardiac myxoma is the most common primary tumour of the heart; often missed due to non-specific symptoms. It may lead to disastrous outcome if it is not treated in a symptomatic patient. Transthoracic echocardiogram (TTE) is the usual imaging modality for establishing the diagnosis.
Methods: We reviewed the different types of presentations and outcomes of patients presented to Sarawak General Hospital, Malaysia with myxoma in 2015.
Results: Case One: A 67-year-old gentleman, initially treated as bronchial asthma, referred to our centre for worsening shortness of breath despite being treated for one week. Chest X-ray (CXR) was unremarkable. Further work-up with TTE showed left atrial mass suggestive of myxoma measuring 4.3 cm x 3.8 cm. Case Two: A 38-year-old lady, with history of ischemic stroke, presented with sudden unilateral limb weakness and fever. No significant neurological deficit but peripheral vasculitic lesions were noted. She was initially investigated for infective endocarditis with embolic event. However, repeated TTE in our centre showed left atrial mass suggestive of myxoma, measuring 2.1 cm x 2.7 cm. Case Three: A 73-year-old previously healthy woman, presented with worsening reduced effort tolerance over the past one month. Examination was suggestive of left heart failure; consistent with CXR findings. Initial TTE showed atrial mass (1.4 cm x 7.2 cm) causing mitral valve obstruction and pulmonary hypertension.
Discussion/Conclusion: The diagnosis of atrial myxoma can be ambiguous and may be easily missed, especially when the different clinical presentations are suggestive of other diagnoses. TTE is investigation of choice for diagnosing myxoma in symptomatic patients. Early surgical intervention is warranted for better outcome. Our review showed all tumour excisions were successful and histopathological examinations confirmed myxoma. Although myxoma is histopathologically benign, they can lead to serious complications e.g. embolism and intracardiac obstruction.

Targeted Delivery of Hydrogen Sulfide by Ultrasound Mediated Microbubble Destruction Alleviates Myocardial Ischemia-reperfusion Injury

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Background: Hydrogen sulfide (H_2S) is an attractive agent for myocardial ischemia-reperfusion injury, however, systemic delivery of H_2S may cause unwanted side effects. Ultrasound mediated microbubble destruction has become a promising tool for organ specific delivery of bioactive substance. We hypothesized that intravenous administration of microbubbles encapsulating H_2S gas combined with ultrasound exposure permit local release of H_2S and alleviates myocardial ischemic-reperfusion injury.
Methods: We developed and characterized microbubbles carrying hydrogen sulfide (hs-MB) with different H_2S/C_3F_8 ratios (4/0, 3/1, 2/2, 1/3, 0/4) and determined the optimal ratio. Release of H_2S trigger by ultrasound was investigated in vitro. In a rodent model of myocardial ischemia-reperfusion injury, hs-MB were administered intravenously with ultrasound applied over the heart. Infarct size was determined by evans blue and TTC staining. Left ventricular structure and function was assessed by echocardiography.
Results: The H_2S/C_3F_8 ratio of 2/2 was found to be an optimal ratio to prepare stable hs-MB with higher H_2S loading capability. The concentration of the hs-MB decreased while the dissolved H_2S increased significantly after exposure to ultrasound. Ultrasound targeted hs-MB destruction limited the extent of myocardial injury and preserved left ventricular function. No significant hemodynamic changes were observed during ultrasound mediated hs-MB destruction.
Conclusions: Delivery of H_2S by ultrasound mediated microbubble destruction limits the extent of myocardial ischemia-reperfusion injury. This may provide a noninvasive strategy for targeted delivery of a therapeutic gas to protect myocardial injury from ischemia-reperfusion, avoiding systemic side effects.

ABSTRACTS

Abstracts for Free Paper Session:

CARDIAC IMAGING

Ultrasonographic Study of Cardiac Function in Larger Twin of Selective Intrauterine Growth Restricted

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Objective: To evaluate cardiac function in larger twin of selective intrauterine growth restricted (sIUGR) using 2D and color Doppler ultrasonography.
Methods: Thirty-five sIUGR pregnancies and thirty-five normal Single pregnancies with same gestational week were enrolled, Cardiac structure and Doppler patterns of the Atrioventricular valve, Tricuspid annulus systolic displacement (TAPSE), Fractional shortening of left ventricle short axis (FS) and myocardial performance index (Tei index) of pulse Doppler were assessed.
Results: Cardiothoracic ratio, Ventricular wall thickness, regurgitation of Atrioventricular valve, Isovolumetric relaxation time of left ventricle (LV-IRT), Tei index of both Ventricle in larger twin of sIUGR (Tei index of left ventricle: 0.45±0.07 vs 0.34±0.03, Tei index of right ventricle: 0.45±0.06 vs 0.35±0.03) were significantly higher than that in normal fetus ($P<0.05$). TAPSE, FS and ejection time of left ventricle and right ventricle (LV-ET, RV-ET) were no significant difference between two groups ($P>0.05$).
Conclusion: The diastolic function in larger twin of sIUGR were declined obviously, but the systolic function were reserved at that time. Tei index of pulse Doppler were helpful to clinical decision.

Papillary Fibroelastoma of the Mitral Valve – Case Report

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Clinical Presentation: A 52-year-old man presented at our hospital with a complaint of redness and swelling of body joints. These symptoms appeared out for over 16 years, and he was diagnosed with arthrolithiasis at local hospital. He transferred to our hospital for further management because the symptoms became more severe nearly for one month. There was primary hypertension history for 15 years and diabetes for 17 years.
Physical Examination: On physical examination, his pulse rate and blood pressure were all in the normal range. Nonspecific murmur was heard. Electrocardiogram and Chest X-ray showed nonspecific changes.
Imaging Findings: Transthoracic echocardiography (TTE) and transesophageal echocardiography (TEE) showed a small strong echo mass (with approximate dimensions of 1.0 cm x 0.8 cm) adhere to anterior mitral valve leaflet (Area A3), the root of the lesions was connected to left atrial side of the valve. The mass presented smooth partial surface and irregularly form, it can change the shape and activity with the cardiac cycle. Color Doppler flow imaging showed that there was no blood flow signal in the mass. Contrast enhancement ultrasound (CEUS) demonstrated smooth opacification of the cavity with detection of contrast microbubbles in all four chambers. There was no microbubble in the mass. The conclusion was that there was a solid mass in the anterior mitral valve leaflet, which was considered to be neoplasm, thrombus or tumour.
Surgery Findings and Pathogenesis: At surgery, a neoplasm with fiber basement was found in the edge of anterior mitral valve leaflet (dimensions of 1 cm x 1 cm). There was filament all over the peripheral. The mass was excised with removal of the base in the anterior mitral valve leaflet and the valve function was not affected. Pathological examination demonstrated it was papillary fibroelastoma of the mitral valve.
Summary and Discussion Points: 1) Papillary fibroelastoma often originated from the valvular endocardium, and the final treatment is surgical excision; 2) TTE and TEE have advantages in accurately diagnosis of cardiac papillary fibroelastoma; 3) Echocardiography results are highly consistent with what was revealed in surgery.

ABSTRACTS

Abstracts for Free Paper Session:

CARDIAC IMAGING

Echocardiographic Characteristics of Sinus of Valsalva Aneurysm Extending into Left Ventricle

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Objective: To investigate image features of sinus of Valsalva aneurysm (SVA) extending into left ventricle (LV) by echocardiography.
Methods: Echocardiographic features of 5 patients treated by surgery at our hospital from July 1995 to September 2015 were reviewed retrospectively and compared with surgical findings, 4 of them combined diagnosed by conventional and 3D echocardiography before surgery.
Results: The origin, extending position, rupture status, complications of the SVAs and associated cardiovascular lesions determined by echocardiography were entirely consistent with surgical findings in all cases, with the exception of one failed diagnosis of hypoplasty of an adjacent aortic cusp. Similar to what was observed with common patterns, the aneurysm extending into LV also presented a thin-walled saccular lesion arising from the aortic root in continuation with the aortic annulus, with significant morphological changes and movement in echocardiographic images. Some unique characteristics were observed simultaneously: 1) very low origin of the saccular lesion arising between the sinus base and the aortic annulus; 2) the aneurysm going back and forth between the aortic root and the left ventricular outflow tract (LVOT) in 4 cases with an intact interventricular septum, and between the LV and the right ventricle through the septal defect in another case complicated by a huge ventricular septal defect (VSD); 3) diastolic shunt into the LV when ruptured; 4) compression and displacement of the adjacent aortic annulus and prolapse of both aortic valve and annulus observed in every case, resulting in a severe aortic regurgitation. Obstructions of the LVOT due to the space-occupying effect were also found.
Conclusions: The SVA extending into LV has distinguished echocardiographic characteristics. Either conventional or live 3D echocardiography could diagnose the disease and cardiovascular complications accurately.

ABSTRACTS

Abstracts for Free Paper Session:

CARDIAC SURGERY

Robotic Cardiac Surgery in Hong Kong

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Traditionally, cardiac surgery is performed through median sternotomy approach due to the requirements of cardiopulmonary bypass and complex surgical procedures. Recent advances in techniques and instruments have allowed less invasive approaches to become more available. The Robotic assisted cardiac surgery programme started in Hong Kong in 2014. This study aims to compare Robotic assisted cardiac surgery to other minimally invasive approaches. From 2007 to 2015, a total of 222 patients had minimally-invasive approach cardiac surgery performed. These approaches include hemi-sternotomy, para-sternotomy, thoracotomy, videoscopic assisted minithoracotomy and robotic assisted minithoracotomy approach. There were 8 patients who underwent robotic-assisted minithoracotomy cardiac surgery. Seven of them had mitral valve repair and 1 had atrial septal defect repair. Post-operative echocardiogram showed no to trivial mitral regurgitation in all 8 patients. There was no in-hospital mortality. One patient required re-exploration for hemostasis. There were no significant difference in pre-operative comorbidity, operative time, cardiopulmonary bypass time and post-operative complication rate compare to the other approaches. Robotic cardiac surgery is a safe and effective minimally invasive approach in cardiac surgery. It has potential benefits over other minimally invasive approaches, such as superior 3D vision, less wound pain, the ability to perform more complicated and delicate intra-cardiac procedure, etc. With continuous advances in this technology, usage of the Robotic assist approach is expected to grow in the future.

'Valve in valve' Aortic Valve Replacement with Sutureless Perceval S Valve – A Third Treatment Option besides Surgical Reoperation and Transcatheter Aortic Valve Implantation

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Stentless valves such as St. Jude Toronto Stentless Porcine Valve (Toronto SPV) provides hemodynamic advantages. However, valve failure due to leaflet tear is common and many patients require re-intervention. Traditionally, these patients have been treated via either aortic root replacement, or recently 'valve in valve' transcatheter aortic valve implantation (TAVI). Sutureless Perceval S valve bioprosthesis uses a sutureless technique that resembles TAVI valve during open surgery. Thus, it can reduce cardiopulmonary bypass and cross clamp time compared to traditional surgical valve replacement. In addition, it can reduce the complications related to TAVI especially in patients with unfavorable anatomy, e.g. low coronary ostia. We present the first case of Sutureless Perceval S valve implantation in a 79-year-old lady with a failed St. Jude Toronto SPV as 'valve in valve' implantation in Hong Kong. She presented 13 years ago with symptomatic aortic stenosis (AS). Open AVR was performed with Toronto SPV at the time. She was well until recent increase in shortness of breath. Transthoracic echocardiogram (TTE) showed severe aortic regurgitation with prolapsed right coronary cusp. CT scan of the aorta showed a calcified aortic root with low lying coronary ostia. She was deemed high risk for root replacement surgery and TAVI. We performed open redo AVR for her with Sutureless Perceval S Valve in order to minimise the surgical risk and decrease cardiopulmonary bypass (CPB) time. Total CPB time was 62 minutes and cross clamp time was 45 minutes. Post-operative course was uneventful and TTE on post-operative day 7 showed no paravalvular leak and functioning AVR. She showed no symptoms of heart failure at 6 months follow up. In this report, we demonstrate the feasibility of Sutureless Perceval S valve implantation as a third treatment option in patients considered high risk in both open surgery and TAVI.

ABSTRACTS

Abstracts for Free Paper Session:

CARDIAC SURGERY

Intra-operative Transit Time Flow Measurement for Coronary Artery Bypass Grafting: A Prospective Computed Tomography Angiography-controlled Study

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Purpose: Early graft failure is associated with poor clinical outcome in coronary artery bypass grafting (CABG) patient and it is usually due to technical factors which may be avoidable if recognized intra-operatively. This has led to the development of intra-operative graft quality assessment tools and the recommendation of routine graft flow assessment in the latest international guideline. Among all the available assessment tools, transit time flow measurement (TTFM) is most commonly used. It is convenient, non-invasive and objective. Several studies had demonstrated its predictive value to early graft failure and major adverse cardiac events (MACE). However, evidence on its usefulness and correlation to post-operative angiographic findings is limited. With the advance of multi-slice high resolution computed tomography (CT) and its increasing availability, CT coronary angiogram is often regarded as the first line screening tool for suspected myocardial ischemia. We therefore aim to evaluate the relationship of TTFM values and post-op CT angiographic findings.
Methods: Between December 2014 and October 2015, TTFM were performed in 59 CABG patients. Forty of them had post-op CT coronary angiogram after a mean follow-up period of 26.7±3.8weeks. Baseline characteristics, peri-operative details and follow-up data including CT coronary angiogram findings were prospectively collected. TTFM was done using Medistim VeriQ™ System. Variables including pulsatility index (PI) and diastolic flow (DF) were recorded.
Results: A total of 117 grafts were performed which comprised of 74 long saphenous veins (SVG), 36 left internal mammary arteries (LIMA) and 7 radial arteries (RA). In view of the scarcity of radial artery grafts, they were excluded in further analysis. The early CT angiographic graft patency was 88.6% (94 out of 106). The mean PI of the CT angiographically patent grafts is significantly lower than that of the stenotic grafts (3.2±1.9 vs 5.1±5.1, p=0.02). However, there is no significant difference of the mean DF among two groups (60.1±13.3) vs 52.7±17.8, p=0.096).
Conclusions: A high PI in TTFM seems to be associated with early graft failure. It may serve as a useful tool to identify defective graft intra-operatively and suggest for graft revision.

Endothelial NOS Enhancer AVE3085 Protects Endothelial Function from the Injury Induced by Homocysteine in Human Internal Mammary Artery and Clinical Implications

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Purpose: Homocysteine (Hcy) is a sulfur-containing amino acid formed during the metabolism of methionine. Hcy is an independent and risk factor for endothelial dysfunction in cardiovascular diseases and atherosclerosis in the general population. We hypothesized that the eNOS transcription enhancer AVE3085 might improve the endothelial function altered by Hcy in the human internal mammary artery (IMA).
Methods: Cumulative concentration-relaxation curves to acetylcholine (-10 to -4.5 log mol/L) were established in IMA (n=64) from 16 patients undergoing coronary artery bypass grafting in precontraction induced by U46619 (-8 log mol/L) in the absence or presence of Hcy (100 μmol/L) with/without AVE3085 (30 μmol/L) *in vitro*. Reverse transcription-polymerase chain reaction (RT-PCR) and enzyme-linked immunosorbent assay (ELISA) were used to quantify the mRNA and protein levels of eNOS.
Results: Maximal relaxation induced by acetylcholine was significantly attenuated by Hcy in human IMA. Co-incubation with AVE3085 protected endothelium from the impairment of Hcy. Exposure to Hcy for 24 h downregulated eNOS protein expression (P<0.05) whereas it upregulated the expression of eNOS at mRNA levels (P<0.05). Adding AVE3085 to Hcy significantly increased the eNOS protein (P<0.05) ad slightly decreased the mRNA level.
Conclusions: Hcy caused endothelial dysfunction through the modulation of NO production associated with a downregulation of eNOS in human IMA. AVE3085 prevents endothelial dysfunction attributed to upregulation of eNOS expression. These findings provide new insights into the protection of the endothelium of the coronary artery bypass grafting conduit and to improve the long-term patency of the grafts.

ABSTRACTS

Abstracts for Free Paper Session:

DIABETES MELLITUS, HYPERTENSION, CARDIAC REHABILITATION

Association of Blood Pressure Level with Nonalcoholic Fatty Liver Disease in Non-hypertensive Population: Normal is not the New Normal

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Background and Aim: Some literatures have reported the relationship between NAFLD and hypertension, but there is no article describes the characteristic of NAFLD in non-hypertensive individuals. This study aimed to determine the strength of the association between NAFLD with normal BP in non-hypertensive individuals.
Method: A cross-sectional study was conducted among patients who came to the sixth Affiliated Hospital of Wenzhou Medical University from October 2007 to December 2011.
Results: Of the 24200 enrolled subjects, 5305 filled the diagnostic criteria for NAFLD (21.9%; 4803 males and 502 females). Non-hypertension was identified in 17403 (71.9%; 8179 males and 9224 females). The PR% of NAFLD for the SBP in quartile 1, quartile 2, quartile 3, and quartile 4 was 10.83, 12.55, 20.38, and 19.97. SBP, DBP, sex, age, ALB, GPT, GOT, FPG, UA, TG, HDL-C and LDL-C are closely associated with the risk for NAFLD. SBP (OR: 1.092, 95%CI: 1.030-1.158; P<0.05) and DBP (OR: 1.157, 95%CI: 1.094-1.223; P<0.05) were found to be independent risk factors for NAFLD.
Conclusions: BP is significantly associated with NAFLD in non-hypertensive individuals; SBP and DBP are found to be independent risk factors for NAFLD.

The Prevalence of Impaired Fasting Blood Glucose in Individuals with Optimal, Normal and High Normal Blood Pressure in Macau SAR

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Purpose: To investigate the prevalence of impaired fasting blood glucose in individuals with high normal blood pressure among residents in Macau SAR.
Methods: A territory-wide cross-sectional population-based survey on the risk factors of hypertension was conducted in Macau SAR, 2012. Household based random sampling design was used. Residents aged 18 years or above of each household were recruited. Blood pressure was measured twice individually and blood samples were collected and analyzed at the Kiang Wu Hospital, Macau. Taking reference to the 2013 ESH/ESC Guidelines for the management of arterial hypertension, optimal blood pressure (OBP) was defined as a systolic blood pressure of <120 mmHg and a diastolic blood pressure of <80 mmHg. Normal blood pressure (NBP) was defined as a SBP of 120-129 mmHg and/or a DBP of 80-84 mmHg and high normal blood pressure (HNBP) as a SBP of 130-139 mmHg and/or a DBP of 85-89 mmHg. Impaired fasting blood glucose was defined as a fasting blood glucose level of 5.6-6.9 mmol/L according to the American Diabetes Association. Participants having a history of diabetes mellitus or hypertension or found to have hypertension or having a fasting blood glucose level of 7.0 mmol/L or above were excluded. Post-stratification adjustment was performed to adjust for age, sex, non-responding households and non-responding residents.
Results: Among a total of 1410 participants, 36.5% were excluded because they were either found to have hypertension or diabetes mellitus. Three hundred and forty-nine of the remaining 895 participants consented to blood taking (212, 93 and 44 in the OBP, NBP and HNBP groups respectively). 15.6%, 30.5% and 28.4% of the participants were found to have impaired fasting blood glucose in the OBP, NBP and HNBP groups respectively. Chi-square tests revealed that sex (being male) (P<0.001), drinking (P=0.001), BMI 23 or above (P<0.001), age 50 years or above (P<0.001) and NBP group as compared with the OBP group (P<0.001) were associated with an increase in risk of having impaired fasting blood glucose. Smoking did not appear to be a risk factor (P=0.915). Individuals with NBP and HNBP had similar prevalence of impaired fasting blood glucose (30.5% vs 28.4%) (P=0.588). Binary logistic regression revealed that older age (>50 years old) (odds ratio (OR): 2.444, 95% confidence intervals (CI): 1.903-3.138) (P<0.001), BMI (≥23) (OR: 2.901, 95% CI: 2.247-3.744) (P<0.001) and blood pressure at NBP range (OR: 1.625, 95% CI: 1.232-2.143) (P=0.001) remained to be important risk factors for the development of impaired fasting blood glucose.
Conclusions: The prevalence rates of impaired fasting blood glucose in individuals with optimal, normal and high normal blood pressure were 15.6%, 30.5% and 28.4% respectively in Macau SAR. Increasing age, BMI and blood pressure were important risk factors for the development of impaired fasting blood glucose.

ABSTRACTS

Abstracts for Free Paper Session:

DIABETES MELLITUS, HYPERTENSION, CARDIAC REHABILITATION

Barriers in Participation in Phase II Cardiac Rehabilitation Program: Did Latest Interventions Help?

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Purpose: A study was done in July 2002 to January 2003 to explore the barriers in participation in phase II cardiac rehabilitation program (CRP) in a regional hospital. After that study, to address barriers including physical unfitness for or fear after exercise stress testing and work or time conflicts, two interventions were applied. Those eligible patients could be enrolled in training program with assessment by using six-minutes walk test or participate in a two-session class. The purpose of this study was to review if there was improvement in participation rate after interventions were applied.
Methods: Cardiac patients referred to phase I CRP in Year 2014 were studied. Patients that did not participate in phase II were reviewed for their possible barriers. The endpoint was evaluated one year after referral to CRP. The results were compared with our previous study done in 2002 to 2003 to determine if those two interventions could improve the participation rate in phase II CRP.
Results: During the 12-month period, a total of 328 patients (235 males, age range: 39-94 years) were referred to phase I CRP. Sixty-six patients proceeded to phase II; the participation rate was 20%. As compared to previous study, percentage of patients that could not participate in phase II CRP due to physical disability or fear after exercise stress testing and work or time conflicts was reduced from 52% to 44% and from 16% to 14%, respectively. The study also showed that with the enhancement of primary percutaneous coronary intervention service, need to attend scheduled cardiac interventions was reduced from 13% to 0%. The proportion of patients that preferred exercise or managed heart problem on their own, or considered cardiac rehabilitation non-essential was increased from 5% to 14%.
Conclusions: The study showed a trend in improvement in the participation rate with new interventions applied to address specific barriers. However, the overall participation rate in phase II CRP remained low. Other strategies to address those specific barriers are warranted.

ABSTRACTS

Abstracts for Free Paper Session:

MISCELLANEOUS

An Evaluation on a Cardiac Nurse-led Anticoagulation Service

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Background: Warfarin is an effective treatment in preventing thromboembolic event and is the recommended treatment option for patient with prosthetic heart valve as well as valvular atrial fibrillation (AF). The stability of international normalized ratio (INR) can be affected by factors like patients' medication adherence and knowledge, warfarin interaction with other drugs and food, and comorbid conditions. In order to optimize treatment efficacy and safety, a cardiac nurse-led anticoagulation service was established in a regional hospital. The services include interval INR monitor, phone-consultation for sub- or supra-therapeutic INR coupled with early nurse-led clinic assessment, as well as protocol-driven warfarin titration if indicated before scheduled doctor clinic follow-up.
Objective: This study aims to evaluate the service outcomes from INR time in target therapeutic range (TTR) and number of adverse event. Reasons for sub- or supra-therapeutic INR were also analyzed.
Methodology: Data from March 2015 to February 2016 were reviewed retrospectively.
Results: Over 6000 INR results of ~400 patients were monitored by trained cardiac nurse, the average TTR was 72.8%. Ninety-two patients (indication: 63% for prosthetic heart valve; 31.5% for AF and 5.5% for others) with sub-therapeutic (41%) or supra-therapeutic (59%) INR (+/- 0.2) were referred to nurse-led clinic for early assessment, education and counselling, and drug titration. They were aged 28 to 85 (mean 64.4; 51% female; >40% with secondary education level or above). All cases were also referred to pharmacist for drug counselling and drug-drug interaction screening. No major bleeding or thromboembolic event was recorded after drug titration. Concrete reason could not be identified. Potential causes for sub- or supra-therapeutic INR were 78% knowledge deficit on anticoagulation care; 24% were non-adherence to treatment; 32% were suspected to have drug-drug interaction; and 21% were having low dietary compliance.
Conclusion: The outcomes demonstrated a safe and quality nurse-led service. In addition, the potential causes reflect the need of multidisciplinary collaboration among parties involved in delivering anticoagulation care in order to achieve a better patient outcome.

Negative Effect of Valsartan on the Expression of CaMKII by Degenerate Phosphorylation but not Oxidation in Juvenile Rats with Heart Failure

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Background: This study was undertaken to determine the relative contributions of phosphorylation and oxidation on the increased activity of CaMKII in juvenile rats with cardiac myocyte dysfunction.
Methods: Juvenile rats (n=28) underwent abdominal aortic constriction (AAC) to induce heart failure (HF) while sham-operated rats were used as a control group (C, n=8). Four weeks post-surgery, echocardiography was performed to evaluate left ventricular (LV) function. Rats with ventricular dysfunction were then randomly divided into two groups: one group given valsartan (30 mg/kg/d, intragastric) as the treatment group (V, n=8) and the other given vehicle as the heart failure group (HF, n=10). After 4 weeks of treatment the animals were sacrificed and Western blot analysis was employed to quantify the phosphorylation (Thr286) and oxidation (Met281) of CaMKII in cardiac myocytes in all groups.
Results: Four weeks after surgery, high-frequency ultrasound echocardiography revealed that LVIDs and LVESV were increased and LVEF and LVFS were decreased in the AAC rats compared to controls. Thr286 phosphorylation of CaMKII was increased 6.15-fold compared to group C, while Met281 oxidation was slightly but not significantly elevated (P>0.05). In rats treated with valsartan no significant differences in the two related activation sites of CaMKII were found relative to group C (P>0.05).
Conclusions: As the phosphorylation of Thr286 is associated with the early activation of CaMKII, rather than the oxidation of Met281, our data suggest that valsartan may exert its therapeutic effects on early-stage heart failure by reducing the phosphorylation of CaMKII.

ABSTRACTS

Abstracts for Free Paper Session:

MISCELLANEOUS

Role of β-catenin in the BMP9-induced Differentiation of C3H10T1/2 Cells into Cardiomyocyte-like Cells

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Objective: To investigate the role of beta-catenin in the differentiation of C3H10T1/2 cells into cardiomyocyte-like cells induced by bone morphogenetic protein 9 (BMP9).
Methods: C3H10T1/2 cells were infected with the recombinant adenovirus for BMP9 and differentiated into cardiomyocytes in vitro for up to 21 days. The active levels of beta-catenin after cultivated with BMP9 and different concentrations of beta-catenin specific inhibitor XAV-939 were detected by Western blotting. Real-time quantitative PCR (qRT-PCR) was performed to evaluate the expression of cardiac specific gene myocyte enhancer factor 2C (MEF2C) and guanine-adenine-thymine-adenine binding protein 4 (GATA4) after one week induced by BMP9 and different concentrations of XAV-939. Three weeks after transfection, the expressions of myocardium specific proteins connexin 43 (CX43) and cardiac troponin T (cTnT) were analyzed by using Western blotting, and immunofluorescence staining was used to observe the locations of CX43 in the cells.
Results: 1) The expression of beta-catenin were significantly increased in the protein levels, while the activation rate could be decreased with the concentration of inhibitor XAV939 increased; 2) After XAV-939 inhibited the activity of beta-catenin, the expressions of MEF2C, GATA4, CX43, cTnT of C3H10T1/2 cells induced by BMP9 was significantly suppressed.
Conclusion: The beta-catenin can be actived by BMP9 and the activation of beta-catenin plays an important role in the differentiation of C3H10T1/2 cell into cardiomyocytes-like cells induced by BMP9.

RALDH2 is Essential for Cardiomyogenesis during P19 Stem Cell Differentiation

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Background: Retinoic acid (RA), a bioactive derivative of vitamin A, plays a crucial role in multiple steps of cardiovascular development. The retinaldehyde dehydrogenase 2 (RALDH2) catalyzes the second oxidative step in RA biosynthesis. RA deficiency is involved in impaired cardiomyogenesis. However, the interaction of RA signaling with other signaling pathways that stimulate or inhibit cardiomyogenesis is not fully elucidated. To investigate the mechanism(s) underlying RA signaling in controlling cardiomyogenesis, we determined the role RALDH2 in regulating cardiomyogenic differentiation of murine P19 pluripotent embryonal carcinoma cells.
Methods: Murine P19 embryonic carcinoma stem cells were utilized to differentiate into cardiomyocytes. The RALDH2 siRNA was used to knock down the expression RALDH2 in P19 cells. The expression levels of cardiomyogenic related genes (Nkx2.5, WT-1, GATA4, a-MHC and CTnT) were profiled using quantitative RT-PCR in a time-dependent manner of differentiation.
Results: Endogenous RALDH2 levels were decreased from day 0, indicating that down-expression of RALDH2 in the transfected cells was confirmed. RALDH2 knock-down alters the gene expression files. The data from quantitative real-time RT-PCR reveals changed expression levels of cardiac muscle-specific molecular markers in RALDH2 knock-down cell lines when compared to that in control cells during differentiation. The progenitor specific gene expression of Nkx2.5 was significantly up-regulated during the cardiomyogenic differentiation of P19 cells, whereas the differentiation related gene expression levels of GATA4, TEF-1, a-MHC and CTnT were markedly decreased. The WT-1 were increased in the early stage of differentiation but decreased in the late stage of differentiation.
Conclusion: These finding suggest that RA signaling is critical for cardiac progenitor differentiation through regulation of cardiomyogenic related gene expression. Reduction of RA signaling may restrict cardiac progenitor differentiation through up-regulation of progenitor cell specific transcription factor Nkx2.5.

ABSTRACTS

Abstracts for Free Paper Session:

MISCELLANEOUS

Effect of Lipid Metabolism Disorders on Fetal Rat Heart in SD Rats

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Objective: To investigate the effect of lipid metabolism disorders in SD rats on fetal rat myocardial cell.
Methods: Select 30 clean grade SD rats, including 10 male and 20 female. After adaptive feeding 3 days, according to the proportion of 2:1 cage for the night, the morning inspection, if we found the sperm by vaginal smear ,it was considered 0.5 days for pregnancy. Pregnant rats were randomly divided into A, B two groups, each group has 10. Group A was fed with ordinary feed, and Group B with high fat feed. Blood samples were collected to determine blood lipid. Fetal rat myocardial tissue was taken to observe under light microscope and electron microscope after dealing with.
Results: The lipid level is similar between the two groups before pregnancy. At 21 days of pregnancy, compared with group A of rats, group B of rats total cholesterol and low density lipoprotein cholesterol increased significantly (P=0), and high-density lipoprotein cholesterol decreased obviously (P=0.001). Under light microscopy to observe two groups of fetal rat myocardial cell with HE staining slice, group B cell structure owes unclear, cell edema, cell nucleus shape is irregular. Two groups of fetal rat myocardial tissue ultrastructure observation indicated: each group A cell organelles, complete and with clear edge structure. Rich mitochondria, mitochondrial cristae complete, muscle wire visible lines are arranged between the mitochondria; The sarcomere is clearly visible. Group B cell organelles, the decrease in the number of mitochondria crest fracture; Decrease in the number of myofibril, sarcomere fuzzy, visible fracture muscle.
Conclusion: High-fat feeding of SD rats exists abnormal lipid metabolism during pregnancy (high cholesterol, low density lipoprotein cholesterol and low high density lipoprotein cholesterol), the fetal rat myocardial cell has damage.

Satellite-based Estimate of $PM_{2.5}$ and the Association with Level of C-reactive Protein in Taiwanese Adults

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Purpose: High-sensitivity C-reactive protein (hs-CRP) is a predictor of cardiovascular disease and may act as a mediator in the development of atherosclerosis. We investigated the association between long-term exposure to fine particu late matter (particulate matter with aerodynamic diameter less than 2.5 μm, $PM_{2.5}$) and hs-CRP in a cohort of Taiwanese adults.
Methods: We performed a cross-sectional analysis using the baseline data of the cohort consisting of 29,199 adults (59.1% men) who participated in a standard medical screening program between 2006 and 2014. An overnight fasting blood sample was taken and hs-CRP was measured by an automated biochemical analyzer. Information on a wide range of potential confounders was collected as well during the medical examination. The participants' residential addresses were geo-coded into latitude and longitude data and then the $PM_{2.5}$ levels at the addresses 1 x 1 kilometer grid were estimated by a remote-sensing algorithm based on the US National Aeronautics and Space Administration satellite data. Multivariable linear regression models were used to investigate the associations between PM exposure and hs-CRP level adjusting for potential confounders.
Results: Annual average concentration of $PM_{2.5}$ was positively associated with hs-CRP. Per 10 $\mu g/m^3$ increment in $PM_{2.5}$ level was associated with 2.89% increase in hs-CRP [95% confidence interval (CI): 2.14%, 3.64%; $P<0.001$]. After full adjustment for age, sex, educational level, body mass index, morbidities (hypertension, diabetes and hyperlipidemia) and lifestyle factors (smoking, alcohol drinking, exercise and diet), the effects were slightly attenuated but remained statistically significant (2.73% increase in hs-CRP per 10 $\mu g/m^3$ increment of $PM_{2.5}$, 95%CI: 2.07%, 3.39%; $P<0.001$).
Conclusions: Our results indicate that long-term exposure to $PM_{2.5}$ is associated with an increased level of hs-CRP. This provides evidence supporting a mechanistic link between long-term exposure to $PM_{2.5}$ and deteriorating cardiovascular health.

ABSTRACTS

Abstracts for Free Paper Session:

MISCELLANEOUS

Protective Effects of Mesenchymal Stem Cells in Combination with Erythropoietin in Bronchopulmonary Dysplasia-induced Alveoli Dysplasia Injury through Angiogenesis

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Introduction: Bronchopulmonary dysplasia (BPD) is the most common chronic lung disease of infancy, currently, no effective therapy is available for it. The aim of the present study was to investigation the treatment effect of bone marrow mesenchymal stem cells (BMSCs) in combination with recombinant human erythropoietin combination (rHuEPO) in hyperoxia-induced BPD injury and discussion the mechanism.
Method: The BPD model was prepared by continuous high oxygen exposure to 14 days, 1 x 10^6 BMSCs and 5000 U/kg rHuEPO were injected respectively at 1h before and 7d after hyperoxia-exposed neonatal mice, the animals received 4 different treatments (n=10 in each group). After raised the mice to 14-day, the body weight and airway structure, mRNA expression of tumour necrosis factor-alpha (TNF-α) interleukin 1 beta (IL-1β) and IL-6 , the protein levels of nuclear factor-κB (NF-κB) and vascular endothelial growth factor (VEGF) were detected by histology, quantitative PCR (qPCR) and western blotting. Cell differentiation was observed type II alveolar epithelial cells (AEC2)-specific marker surfactant protein-C (SP-C) and platelet endothelial cell adhesion molecule-1 (PECAM-1/CD31) by immunofluorescence.
Result: Compared with BMSCs alone, the body weight, airway structure, the levels of inflammatory cytokines and VEGF were significantly improvement in BMSCs/EPO group. Fourteen days after engraftment, BMSCs co-expressed PECAM-1 and type II alveolar epithelial cells (AEC2)-specific marker SP-C, but not AEC1-marker AQP5.
Conclusion: Two weeks after injection of BMSCs in combination with EPO significantly promoted lung repair after hyperoxia-induced alveoli dysplasia injury, decreased inflammation and enhanced angiogenesis. Therefore, the protective effect maybe through modulation of paracrine mechanism and provides firm information for clinical trial.

Tetramethylpyrazine Protects Coronary Endothelial Function from Endoplasmic Reticulum Stress: Regulation of Soluble Epoxide Hydrolase

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Purpose: Activation of soluble epoxide hydrolase (sEH) is associated with endothelial dysfunction in hypertension, though mechanisms of sEH activation have been inadequately understood. Whether endoplasmic reticulum (ER) stress is involved is yet to be studied. Tetramethylpyrazine (TMP) is an active ingredient of Chinese herb Chuanxiong that has cardiovascular benefits. Whether TMP possesses anti-ER stress properties to confer vasoprotection and whether regulation of endothelial sEH is involved remains uninvestigated.
Methods: Primary cultured porcine coronary endothelial cells (PCECs) were used for western blot and reverse-transcription PCR analysis. Myograph study was performed to evaluate endothelial function of porcine coronary arteries.
Results: Angiotensin II (Ang-II) increased sEH expression in PCECs, associated with upregulation of ER stress molecules including GRP78, p-IRE1α, and ATF6. Pretreatment of PCECs with ER stress inhibitors suppressed Ang-II-induced sEH expression. TMP showed comparable effect to that of ER stress inhibitors against Ang-II-induced ER stress and sEH upregulation. The anti-ER stress-mediated normalization of sEH expression conferred by TMP was further observed in PCECs exposed to the ER stressor tunicamycin. TMP was effective in preventing Ang-II-induced endothelial dysfunction and the effect was comparable to that of ER stress inhibitors.
Conclusions: ER stress mediates Ang-II-induced sEH upregulation in coronary endothelium. TMP has potent anti-ER stress capacity through which TMP normalizes sEH expression and confers protective effect against Ang-II on endothelial function of coronary arteries. These findings added new mechanistic insight into the cardiovascular benefits of this traditional Chinese medicine that may have potential clinical implications for the treatment of hypertension.

ABSTRACTS

Abstracts for Free Paper Session:

MISCELLANEOUS

A Tale of 3-gorges in the Yangtze River: Comparing the Prevalence of Metabolic Syndrome According to NCEP-ATPIII, WHO, IDF Criteria and Impact on Atherogenesis

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Purpose: Metabolic syndrome (MS) is associated with atherosclerotic diseases. The prevalence of MS according to Adult Treatment Panel III (ATPIII), World Health Organization (WHO) and International Diabetes Federation (IDF) criteria is variable but increasing in western countries and modernizing Chinese communities. This study aims to evaluate the prevalence of MS and impact on atherosclerotic surrogate according to these 3 criteria in farmers or residents in 3-gorges territories undergoing a rapid lifestyle changes related to 3-gorges dam construction.
Methods: We compared 95 residents (ex-farmers) in Wu Shan (WS) (28.4% males, aged 49.7±9 years) resettled uphill for 3-5 years, and 87 age and gender-matched farmers in Da Chang (DC) (27.6% males, aged 48.8±10 years) prior to resettlement. MS and other traditional risk factors were assessed, and carotid intima-media thickness (IMT), a surrogate atherosclerotic marker, was measured by high resolution ultrasound.
Results: 99% of WS residents were retired or adopted non-farming jobs (P<0.0001). Compared with DC farmers, WS residents had higher waist circumference, LDL-cholesterol and triglycerides (P<0.0001), but their blood pressures, HDL-cholesterol and fasting glucose were similar. MS were identified in 43.2% (IDF), 36.8% (WHO) and 29.5% (ATPIII) in WS, compared with 17.2%, 13.8% and 11.5% respectively in DC. Carotid IMT was significantly higher in WS residents (0.74±0.16 mm) than in DC farmers (0.64±0.11 mm) (P<0.0001). On multivariate regression analysis, carotid IMT was better correlated with IDF criteria of MS, independent of age and LDL-cholesterol and resident group.

	NCEP-ATPIII	WHO	IDF
β-Values (P-value)	0.145 (P=0.082)	0.074 (P=0.327)	0.269 (P=0.002)
Regression F-value	11.2	10.8	12.8
R-Value (P-value)	0.661 (P<0.0001)	0.653 (P<0.0001)	0.685 (P<0.0001)

Conclusions: IDF MS criteria is more sensitive and better correlates with atherosclerosis surrogate, and more applicable to the Chinese currently undergoing rapid economic transition.

Epigallocatechin Gallate (EGCG) Reverses Cardiac Troponin I Low Expression Induced Heart Diastolic Dysfunction through Histone Acetylation Modification in Aging Mice

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Purpose: Cardiac diastolic dysfunction (CDD) is the most common form of cardiovascular disorders, especially in elderly people. However the underlying mechanisms of CDD in aging populations are still not clear, and there is also still lack of effective interventions targeting on CDD. This study was designed to investigate: 1) whether the diastolic dysfunction commonly observed in older hearts is associated with the cTnI decrease and what cause a cTnI decrease; 2) whether epigallocatechin-3-gallate (EGCG) would modify histone acetylation events to regulate cTnI expression and then improve cardiac functions in aging mice.
Methods: Western blotting and Quantitative-polymerase chain reaction (Q-PCR) were used to detect cTnI expression levels; High frequency echocardiography and transmission electron microscope (TEM) were employed to analyze cardiac function and ultra structure of mice; DNA methylation and histone acetylation modifications of cTnI were determined by methylmion specific PCR/bisulfite sequencing PCR and chromatin immunoprecipitation (ChIP).
Results: Compared to 3 month (3 m) mice, the cardiac diastolic function of aging mice were significantly decreased, TEM showed and a destruction of myofilament in aged mice. A lower expression of cTnI both in protein and mRNA levels were found in aging mice compared with 3 m mice. DNA methylation level of cTnI showed no significant changes among each group. ChIP assays demonstrated that AcH3 and AcH3K9 levels in the key-cis elements of cTnI at 3 m were higher than that at aged stage. We then evaluated the binding levels of transcription factors Mef2c and GATA4 with those elements, the binding levels of both Mef2c and GATA4 were reduced in aging hearts. Further studies demonstrated that EGCG could improve cardiac function of aging mice, and reverse cTnI decrease through inhibiting HDAC1 binding with key-cis elements of cTnI's promoter, which may up-regulate its histone acetylation level of the promoter and increase the binding levels of Mef2c and GATA4 with it.
Conclusions: Our study indicates that epigenetic modification caused cTnI expression decrease is one of the causes that result in a reduced cTnI level and diastolic dysfunction in the older hearts, and provide new insights into histone acetylation mechanisms of EGCG that may contribute to the prevention of CDD in aging populations.

ABSTRACTS

Abstracts for Free Paper Session:

PAEDIATRIC CARDIOLOGY I

The Use of Duke Activity Status Index (DASI) in Congenital Heart Patients – A Preliminary Study

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Background and Objectives: Assessment of exercise capacity has been part of the clinical evaluation in patients with congenital heart disease. However, its use is limited by the cost and availability of a well-equipped cardiopulmonary exercise laboratory and the trained expertise to conduct the test. Studies demonstrated the feasibility of using Duke Activity Status Index (DASI), a 12-items validated disease-specific self-reported questionnaire, to assess the functional capacity in patients with heart failure and patients after cardiac surgery. Regression equation has been derived to estimate the peak oxygen consumption (MVO2) using DASI. Data is lacking about its use in congenital heart disease and Chinese subjects. We aimed to translate the DASI in traditional Chinese and to test the feasibility of its use in local patients with congenital heart disease.

Methods: The 12-items DASI questionnaire was translated into traditional Chinese and back-translated into English for comparison with the original English version. Modification was made to enhance the comprehension of the items in Chinese. The translated DASI was administered to 48 patients (25 males; mean age of 27.8±7.7 years) with congenital heart disease at the time just before their scheduled cardiopulmonary treadmill exercise test using Bruce protocol. Correlation between the DASI score, NYHA class, Warnes-Somerville Ability Index (WSAI), Disease complexity and exercise test variables was assessed accordingly.

Results: Thirty-six patients (75%) were in NYHA class I, and 12 patients in NYHA class II. For WSAI, 37 patients in grade 1 and 11 patients in grade 2. Most of the patients' heart were of moderate complexity (N = 30), with 17 of great complexity and 1 of simple complexity. The mean DASI score was 41.2±11.8. Internal consistency of the DASI items as reflected by Cronbach's alpha was 0.78. The mean MVO2 was 28.20±6.95 $ml.kg^{-1}.min^{-1}$ and the mean exercise duration was 9.21±2.19minutes. DASI was significantly correlated with age ($r=-0.33$, $p=0.23$), NYHA class ($rs=-0.031$, $p<0.05$), WSAI ($rs=-0.35$, $p<0.05$), complexity ($rs=-0.33$, $p<0.05$), MVO2 ($r=0.46$, $p=0.001$) and exercise duration ($r=0.55$, $p<0.001$). MVO2 was not significantly different among different NYHA classes, WSAI grades and disease complexity. MOV2 and exercise duration was predicted by DASI in regression analysis as: MVO2 ($ml.kg^{-1}.min^{-1}$) = 0.269 x DASI + 17.1 and Exercise duration (minute) = 0.103 x DASI + 4.985 respectively.

Conclusions: The translated DASI is a feasible instrument to assess the functional capacity in Chinese patients with congenital heart diseases. Further studies may help confirm its use in formal assessment and follow-up of patients.

ABSTRACTS

Abstracts for Free Paper Session:

PAEDIATRIC CARDIOLOGY I

A Prospective Randomised Study of Intravenous Immunoglobulin Treatment Regimens in Acute Kawasaki Disease

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Objective: To find the most optimal intravenous immunoglobulin (IVIG) treatment regimen in acute Kawasaki Disease (KD) through an investigation of three regimens and their respective effects on clinical characteristics and coronary artery changes in acute KD though a multicentre randomised control study.

Methods: Between January 2014 and December 2015, a prospective randomised control study was performed at three children's hospitals in Shanghai, China in children between 1 month to 12 years of age with a confirmed diagnosis of acute untreated KD. After consent was obtained from a legal guardian, subjects were divided into three groups using simple randomisation. Group A received IVIG 2 g/kg once over 12-24 hours; group B received IVIG 1 g/kg twice, administered over two days; group C received IVIG 1 g/kg once over 12-24 hours. Patients in all three groups received IVIG within 5 to 10 days of onset of symptoms, and were simultaneously administered aspirin at 30-50 mg/kg/d split into three doses per day. Patients who did not respond to initial IVIG therapy were given a second dose of IVIG 36 hours after the initial dose at 2 g/kg. Patients who did not respond to the second dose of IVIG were given either high-dose pulse therapy of methylprednisolone 10-20 mg/kg/d or TNF-α antagonist (infliximab) therapy. Patient demographics and clinical and laboratory test changes, including temperature, white blood cell count (WBC), C-reactive protein (CRP), platelet count (PLT), erythrocyte sedimentation rate (ESR), serum albumin, serum sodium, and alanine transaminase (ALT) through the course of disease were recorded. Length of stay in hospital and cost were also recorded, in addition to any adverse effects during course of treatment. Follow-up data, including echocardiography at different phases of disease, were statistically analysed. This trial is registered with *ClinicalTrials.gov*, number NCT0239996.

Results: 397 patients met inclusion criteria, of which 249 were males and 148 were female (male to female ratio = 1.682:1). Group A had 138 patients (34.80%), with an average age of 26.43±22.698 months and average weight of 12.48±4.381 kg. Of these patients, 13 (9.42%) had incomplete Kawasaki Disease (IKD). Group B had 127 patients (32.00%), with an average age of 28.82±22.266 months and average weight of 13.23±5.154 kg, with 15 cases (11.81%) of IKD. Group C had 132 patients (33.25%), with an average age of 26.13±20.039 months and average weight of 12.96±5.726 kg, with 15 cases (11.36%) of IKD. There was no significant difference in age, weight, sex ratio, or IKD ratio between the three groups (P>0.05) with appropriate comparability. No statistical difference was found between the three groups in clinical characteristics and pre-treatment laboratory results (P>0.05). Coronary changes within the first ten days of disease onset were detected in 57 patients (14.35%), of which 21 were from Group A, 19 were from Group B, and 17 were from Group C, with no significant difference among the three groups. At one month after disease onset, grade II coronary changes were detected in 29 patients (12 in Group A, 7 in Group B, 10 in Group C), grade III coronary changes were detected in 25 patients (9 in Group A, 10 in Group B, 6 in Group C), grade IV coronary changes were detected in 3 patients (none in Group A, 2 in Group B, 1 in Group C). When incidence of coronary changes was compared between the three groups, no significant difference was found (P=0.634). There was no significant difference in duration of fever prior to admission. After treatment, time to defervescence for groups A, B, and C were 1.083±0.749, 1.039±0.686, and 1.110±0.737 days, respectively, with no significant difference between the groups (P=0.733). There was also no significant difference in total days of fever between the groups. There was no significant difference between the groups in the number of patients who were not responsive to initial IVIG therapy. Between the three groups, WBC, CRP, and ALT levels all decreased after IVIG therapy, while PLT increased. There was no significant difference in magnitude of change between the three groups. There was no significant difference in length of stay in hospital, but Group B had the highest cost and Group C had the lowest cost (P=0.0002). Group C had the best cost-benefit ratio among the three groups.

Conclusion: For patients with acute KD, IVIG administered in a single 1 g/kg dose, when compared with 1 g/kg over two days and a single 2 g/kg dose, have comparable effects on time to defervesecence, prevention of coronary changes, and improvement of laboratory test results. However, the 1 g/kg single dose regimen can significantly reduce the cost of treatment. Further studies on IVIG treatment regimens in KD in more centres and in a mixed ethnic population are warranted.

ABSTRACTS

Abstracts for Free Paper Session:

PAEDIATRIC CARDIOLOGY I

Shock as Prominent Early Manifestation of Kawasaki Disease in Children

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Objective: We sought to define the characteristics that distinguish Kawasaki disease shock syndrome (KDSS) from hemodynamically normal Kawasaki disease.
Methods: We collected data prospectively for all patients with Kawasaki disease who were treated at a single institution during a 2-year period. We defined Kawasaki disease shock syndrome on the basis of systolic hypotension for age, a sustained decrease in systolic blood pressure from baseline of ≥20%, or clinical signs of poor perfusion. We compared clinical and laboratory features, coronary artery measurements, and responses to therapy and analyzed indices of ventricular systolic and diastolic function during acute and convalescent Kawasaki disease.
Results: Of 231 consecutive patients with Kawasaki disease, 4 (1.73%) met the definition for KDSS. All required fluid resuscitation and vasoactive infusions. Compared with patients without shock, patients with Kawasaki disease shock syndrome were more often female, the age of patients with KDSS was between 5.2 to 8.9 years, as well as had larger proportions of bands, higher C-reactive protein concentrations, and lower hemoglobin concentrations and platelet counts. Evidence of consumptive coagulopathy was common in the KDSS group. Patients with KDSS more often had impaired left ventricular systolic function (All ejection fraction <54% [100.00%] vs 22 of 227 patients [9.69%]), mitral regurgitation (3 of 4 patients [75.00%] vs 31 of 227 patients [13.66%]), coronary artery abnormalities (3 of 4 patients [75.00%] vs 18 of 227 patients [7.92%]), and intravenous immunoglobulin resistance (4 of 4 patients [100.00%] vs 46 of 227 patients [20.26%]). Impairment of ventricular relaxation and compliance persisted among patients with KDSS after the resolution of other hemodynamic disturbances.
Conclusions: Patients with KDSS may have uneven clinical course and may be misdiagnosed in the beginning. They may have more prominent inflammatory markers in the early phase and higher risk of coronary artery dilatation.

FECI (Focused Echocardiographic Coronary Imaging): A Novel Systemic Approach for Identifying & Detecting Coronary Abnormalities in Kawasaki Disease

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Background: Kawasaki disease (KD) may induce coronary artery abnormalities (CAA) ranging from transient ectasia, small aneurysm to giant aneurysm. The incidence of CAA used to be around 5-10% after acute phase of KD. Based on our experience, coronary arteries dimensions alone may be misclassified as normal in acute KD. There had been scanty information about the systemic approach to examine the status of coronary arteries in children with KD. We thus proposed & developed a novel focused echocardiographic coronary imaging (FECI) approach.
Methods: Between July 2013 and June 2014, a total of 35 patients with acute phase KD was enrolled, and 100 normal pediatric patients was used for control. We employed commercially available ultrasonoscope for examination. All the patients were examined at diagnosis, 1, 2 and 6-8 weeks after the onset of illness. Assessment of right coronary (proximal and distal portions), left main (middle portion), left anterior descending (proximal and distal portions) and circumflex arteries (proximal portion) was performed in each patients. CAA is considered at the presence of any of the following: 1) dilatation or aneurysm formation 2) lack of tapering 3) irregularity 4) intimal enhancement with brightness in the coronary arterial wall.
Results: Various CAA were present in acute KD, include various degree of dilatation in 11 (31%), aneurysm formation in 2 (6%), lack of tapering in 13 (37%), irregularity in 12 (34%), and intimal thickening (brightness) in 23 (65%) patients respectively. Overall, CAA was present in 32 (91%) of our patients in acute KD.
Conclusion: Our result showed that the incidence of CAA in acute KD is higher than previously reported. Echocardiography can provide an accurate and timely diagnosis regarding the presence of cardiac and coronary artery lesions in acute KD. With our novel FECI method, more detailed and comprehensive features of CAA other than coronary aneurysm and dilatation can be provided through this systemic approach.

ABSTRACTS

Abstracts for Free Paper Session:

PAEDIATRIC CARDIOLOGY I

Adverse Neurological Performance with Critical Congenital Heart Diseases mainly from Prenatal Injury not Cardiac Surgery: Current Evidence based on a Meta-analysis of Functional Magnetic Resonance Imaging

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Objective: No consensus has been reached regarding whether congenital heart disease (CHD) related brain injury is caused by cardiac surgery or prenatal injury of CHD. We performed this meta-analysis to identify the likely cause of adverse neurological performance in CHD patients.
Methods: Literature search was done in December 2013 and records were retrieved from PubMed, Embase, the Cochrane Library and WHO trails center without language restriction. Studies applying functional magnetic resonance imaging (fMRI) evaluation of brain function before and after surgery were included. The preoperative and postoperative fMRI results were extracted, and meta-analysis was performed using Revman 5.1.1and STATA 11.0, according to the guidelines from the Cochrane review group and the MOOSE guidance.
Results: A total of 937 citations were yielded from electronic search. Full-texts were retrieved for 16 articles and the following studies were eligible for inclusion: 6 studies (n=327 cases) with fMRI analysis before surgery and 3 studies (n=36 cases) with completing perioperative fMRI analysis. The overall average diffusivity of CHD cases was significant higher with a summarized Std. Mean Difference of 1.39 (95% CI=0.70, 2.08), and the fractional anisotropy was lower in CHD cases with a summarized Std. Mean Difference of-1.34 (95% CI=-1.64, -1.04). NAA/Cho and Lac/Cho were recorded in CHD cases with significant differences compared to healthy ones. In postoperative near term, significant change in NAA/Cr and NAA/Cho were found. However, the difference was not found in follow up.
Conclusion: The meta-analysis demonstrated the delay in neurological development in newborns with congenital heart disease, and cardiac surgery might lead to mild brain injuries postoperatively, but recovery of fMRI evaluation has been identified during the follow-up.

Analysis of the Clinical Value of Selective Coronary Angiography in Children with Coronary Lesions Caused by Kawasaki Disease (A Report of Six Cases)

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Guangdong Cardiovascular Institute, China

Objective: To analyze the clinical value of selective coronary angiography (SCAG) to the coronary lesions caused by Kawasaki disease (KD) in children, and explore the significance of SCAG to the interventional therapy.
Method: 6 children are in the age of 2-14 years old, the median age was 7.5 years old; all of them have a clear history of KD. Transthoracic echocardiography (TTE) showed them had coronary artery lesions more or less, including heart failure and myocardial infarction of 2 cases. Six cases were examined by SCAG, according to the results, 2 cases proceeded intravascular ultrasound (IVUS), another 2 cases underwent percutaneous balloon angioplasty, and another child received coronary artery stent implantation.
Results: SCAG results showed that 6 cases had different degree of coronary artery lesions. Case 1 got coronary artery dilatation but no aneurysm formation, and there was no clinical symptom, such as chest pain, so that no interventional therapy taken; 2 cases had coronary artery aneurysm without obvious stenosis, both of them underwent IVUS evaluation of the coronary artery wall, but without further intervention; 3 cases showed coronary artery aneurysms combined with stenosis, and two of them took percutaneous balloon angioplasty, the stenosis totally or partially relieved; the rest one got percutaneous coronary artery stent implantation.
Conclusion: Selective angiography of coronary artery lesions is a safe, effective, accurate way to estimate coronary artery lesions in KD children,

ABSTRACTS

Abstracts for Free Paper Session:

PAEDIATRIC CARDIOLOGY I

Recurrent Hemoptysis of Pulmonary Vascular Anomalies in Children – A Series of 11 Cases treated with Catheter-based Therapy

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

Objective: Catheter-based therapy is as the first-line management for hemoptysis related to pulmonary vascular anomalies. This study is determined to summarize the data of recurrent hemoptysis after catheterization, to probe into factors, eventually to set up a suitable method, aiming at decreasing or avoiding the recurrence.
Method: A retrospective review of 16 cases suffered from hemoptysis. After underwent a standard medical conservative management, the clinical manifestations got an unobvious relief. Patients were suspected or confirmed diagnosed as hemoptysis of vascular anomalies *via* chest X-ray (CXR), bronchoscope, computed tomography angiography (CTA) and digital subtraction angiography (DSA), a golden standard of cardiovascular disease examination, clearly detecting the origination, site and diameter of culprit vessels. For cases managed with Cardiofix, DSA evaluates the instant plugging effect and as a long term follow-up tool. While clinical characteristics are administrated periodically.
Result: All patients were with diverse degrees of hemoptysis, and imaging outcomes which presented 14 cases (87.5%) with aortopulmonary collateral circulation, 1 case (6.25%) with pulmonary arteriovenus fistula (PAVF), and 1 case (6.25%) with bronchial artery to pulmonary circulation shunt (BPS). Ultimately, 1 case (6.25%) received a ligation management via thoracoscope, 1 case (6.25%) selected a lung resection, and both displaying an effective prognosis for a long term follow-up. Other 11 cases (68.75%) were treated with a catheterization, and then DSA displayed that there existed a few residual shunts instantly, which mostly were to decrease gradually in next several months. However, 3 patients, roughly 27.3% were readmitted to hospital for an obvious remitting hemoptysis in one year. All presented aortopulmanory collateral arteries that are of a large amounts, unequal-diameters and tortuous routes. Therapeutically, 2 cases were undertaken for twice occlusion, 1 case for 3 times.
Conclusion: Vascular correlation hemoptysis happened to elderly children significantly, about 5-12 years. And Cather-based management is as primary therapeutic tool for it, after which recurrence is not rare. As to recurring episodes with collateral arteries, gaining and summarizing an accurate imaging findings, selecting a suitable management are the key procedures.

The Meta Analysis of Infective Endocarditis in Chinese Children

Q Hu, Y Chen
Department of Cardiology, Children's Hospital of Chongqing Medical University, China

Objective: A meta-analysis was conducted to summarize Chinese children estimates of the clinical characteristics, complications, treatment and outcomes of infective endocarditis by R statistical software.
Methods: Four main electronic databases (WanFang database, VIP database, China National Knowledge Infrastructure and PubMed database) was systematically and inclusively searched for all IE studies with Chinese children through March 2016. Meta-analysis was conducted by using R.3.2.2. Pooled values and 95% CIs were generated from a fixed-effects model or from a random-effects model according to statistical tests for heterogeneity. Publication bias was assessed by using the Egger test, meta-regression and subgroup analyses was employed to examine the effect of study-level variables.
Results: Sixteen studies were selected with a total of 892 IE, the pooled proportion of male was 55% (95%CI: 51%-58%). The pooled proportion of IE with CHD was 68% (95%CI: 62%-72%), and 33% (95%CI: 27%-40%) was VSD. The pooled rate of IE with RHD was 10% (95%CI: 7%-14%). The most common clinical manifestation was fever (89% [95%CI: 84%-93%]). The pooled rate of embolism and heart failure were 22% (95%CI: 19%-26%) and 45% (95%CI: 34%-56%). Among positive blood culture, the pooled rate of gram-positive bacterium was 87 (95%CI: 83%-90%), followed by fungus (5% [95%CI: 3%-8%]) and gram-negative bacterium (9 [95%CI: 7%-13%]). The pooled rates of left heart and right heart were affected in 60% (95%CI: 43%-75%) and 33% (95%CI: 21%-48%). The pooled proportion of case-children with surgical treatment was 21% (95%CI: 13%-32%). The pooled case-fatality rate for IE was 14% (95%CI: 10%-18%), and it was different from place to place.
Conclusion: IE was associated with significant mortality in Chinese children, and the case-fatality rate for it could vary depending on the area. The incidence rate of IE had nothing to do with gender. CHD was the major risk factor for IE; however, RHD was also an important risk factor. Staphylococcus aureus was the main pathogens of the cases of IE. The left heart was affected in more episodes than the right heart.

ABSTRACTS

Abstracts for Free Paper Session:

PAEDIATRIC CARDIOLOGY I

Early and Midterm Follow-up of Vascular Endothelial Function in Children with Surgical Repair for Coarctation of Aorta

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Department of Pediatrics, Guangzhou Women and Children's Medical Center, China

Background: Although undergone successful surgery of coarctation of aorta (CoA), long-term mortality remains high attributable to cardiovascular complication. In general, it seems well in midterm follow-up without hypertension, ventricular hypertrophy, but structural and functional abnormalities can be found, even repaired in childhood. The aim of the present study is to evaluate the peripheral endothelial function in children with 4 years follow-up (from January 2010 to December 2014) after successfully repaired of CoA.
Methods: A group of 20 children (range 4 days to 10 years, mean 1.69 years old) who after successful CoA repair between January 2010 and October 2010 in Guangzhou Women and Children's Medical Center was studied. There were 14 males and 6 females in CoA group, which comprised 6 patients with isolated CoA and the others with combined heart malformations, including 12 children operated before 6 months (early surgery group) and 8 children operated after 6 months (non early surgery group). And 20 healthy children for health physical examination at the same time were enrolled as control group. All subjects underwent monitoring of resting blood pressure, echocardiography and flow-mediated dilation (FMD) of the brachial artery, before operation or blank intervention and 4 years follow-up.
Result: There were no resting hypertension in all subjects in 4 years of follow-up. And no recoarctation and pseudoaneurysm occurred in CoA group, but brachial artery FMD in CoA group was higher than control group, both before operation or blank, 1 year and 4 years after that ($P<0.05$). But there were no statistical differences between early surgery group and non early surgery group in the above period respectively ($P>0.05$).
Conclusion: Although all children were normotensive in the mid-term follow-up after successful repair, endothelial damage could be found characterized by reduced brachial artery FMD, which indicated that operation could cure the mechanical obstruction of the aorta, but not the vascular function. And early surgery does not lessen vascular endothelia impairment.

PAEDIATRIC CARDIOLOGY II

Successful Transcatheter Occlusion of Giant Coronary Artery Fistula in a Young Infant: Case Report and Literature Review

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Congenital coronary artery fistula is a rare anomaly with different clinical manifestation. A giant one can cause heart failure and 'steal' phenomenon by large amount of left to right shunt. Recently, transcatheter occlusion for congenital coronary artery fistula has been advocated as an effective alternative to surgical repair in children and adult patients, but in infant it is still a challenge. We report a 22-day-old infant who had tachycardia, tachypnea, interrupted feeding, repeated and transient pale face, cardiomegaly, continuous murmur, a 7 mm fistula at the narrowest point from right coronary artery to right ventricle demonstrated by angiogram, and a large amount of shunt with Qp/Qs equal to 3.6, and who underwent successful transcatheter occlusion by an Amplatzer Vascular Plug II one month after admission. At review 3 months after device occlusion showed that myocardial enzyme analysis, electrocardiography, and echocardiography were normal.

Association of Patient Laboratory Variables and Serum Levels of Cytokines with Coronary Artery Lesions in Acute Phase of Kawasaki Disease

F Gao, X Zhou, SK Yadav, SQ Feng, QJ Yi
Heart Center, Childern's Hospital of Chongqing Medical University, China

Background: Kawasaki disease (KD) is the most common cause of acquired cardiac disease in developed countries. Imbalance between Th1 and Th2 immune responses may play an important role in the development of KD. In the present study, we explored the serum levels and the ratio of TNF-α and IL-5, and the correlation of TNF-α and IL-5 with other laboratory variables of the patients with coronary artery lesions in acute phase of Kawasaki Disease.
Methods: The present study included 42 children with KD. We also recruited 30 diseased control subjects and 26 healthy subjects. Serum concentrations of TNF-α and IL-5 were assayed using a commercially available enzyme-linked immunosorbent assay (ELISA).
Results: IL-5 levels were significantly higher in KD patients with CALs compared with KD patients without. Higher serum levels of TNF-α were also observed in KD patients with CALs compared to KD patients without CALs; however, the difference was not significant. There were statistically significant differences in neutrophilic granulocytes (N) and lymphocytes (L) between KD patients with and without CALs.
Conclusion: CALs may be associated with increased levels of neutrophilic granulocytes, TNF-α and IL-5. Furthermore, activation of Th1 and Th2 cells

ABSTRACTS

Abstracts for Free Paper Session:

PAEDIATRIC CARDIOLOGY II

Clinical Analysis and Follow-up of Kawasaki Disease Infants Less than Three Months

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Objective: To analyze the clinical feature and follow-up of infants aged <3 months suffering from Kawasaki disease (KD), to increase early diagnosis of KD and minimize the occurrence of coronary artery complications.
Methods: The data of 31 cases with infant less than three months KD admitted from January of 2009 to June of 2013 were analyzed retrospectively in our hospital.
Results: Of 1107 patients with KD, 2.8% were less than three months. Male-female ratio of infant KD was 4.17:1. The incidence of the atypical KD was higher, the incomplete KD accounted for about 51.6%. In the principal clinical features, the clinical manifestation of the incomplete group performed lowly in acute stage. Respiratory infection and diarrhea were occurred in the almost half of 31 cases. The number of white blood cell, C-reactive protein (CRP) and erythrocyte sedimentation rate (ESR) was statistically higher, but there was no significant difference in the inflammatory findings between classic and incomplete KD (P>0.05). The rate of coronary artery lesion of incomplete cases appeared to be similar to that of classic cases (P>0.05), Coronary artery abnormalities were seen in 83.9% (20/31). The prevalence of coronary artery aneurysms with KD was 9.7% (3/31). In this group of patients with median follow-up period was 13 months (6 to 35) showed that about 90% of infants had normal coronary arteries after standard therapy.
Conclusion: Attention should be aroused to the infants less than 3 months with fever lasting longer than 5 days if treatment shows no effect. Therefore, they are helpful for early diagnosis such as in time examine of coronary artery abnormalities, ESR and CRP, especially platelet change.

The Association between Renin-angiotensin System Gene Polymorphism and Risk of Hypertension in Pediatric Patients: A Meta-Analysis

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Objective: To explore the association between the genetic markers ACE (I/D), AGT (M235T), AT1R (A1166C) and risk of hypertension in pediatric patients.
Methods: EMBASE, PubMed, Hartford User Group Exchange (HUGE), CNKI, VIP, Wanfang data and CBM database were searched for the case-control studies on the association of three gene polymorphisms with hypertension in pediatric patients from the establishment to 1st March 2016. Data extraction, quality assessment, pooled analysis was conducted. Meta-analysis on the association of three gene polymorphisms with hypertension between hypertension group and control group under recessiveness, dominance, co-dominance, addition and allele gene models was performed. Statistical analyses were analyzed by Stata12.0 software.
Results: A total of 969 patients and 1875 controls in 8 studies with moderate bias risk were included. An increased risk of ACE (I/D) D variant with 7 included studies in the meta-analysis under recessive model (OR=1.355, 95%CI = 1.063-1.727, P=0.014) and dominant model (OR=1.369, 95%CI =1.080-1.736, P=0.009). Neither ANG (M235T) polymorphism with 3 enrolled studies nor AT1R (A1166C) polymorphism with 2 enrolled studies was found to have significant association with hypertension in pediatric population under recessiveness, dominance, co-dominance, addition and allele gene models. Subgroup analysis revealed that ACE (I/D) D variant was associated with an increased risk of hypertension in obese pediatric population under recessive model (OR=1.564, 95%CI=1.054-2.321, P=0.026), additive model (OR=2.017, 95%CI=1.137-3.576, P=0.016) and allele model (OR=1.406, 95%CI=1.076-1.838, P=0.013). There were no significant differences in the frequencies distribution of ACE (I/D) between two groups in general population by considering ethnicity and classification of hypertension.
Conclusions: No significant association was found between ANG M235T, AT1R A1166C polymorphisms and hypertension in pediatric population. The ACE (I/D) polymorphism was found to have association with susceptibility to hypertension in the obese pediatric population.

ABSTRACTS

Abstracts for Free Paper Session:

PAEDIATRIC CARDIOLOGY II

Comparative Study between Cardiovascular Cast and Prenatal Echocardiography in the Demonstration of Fetal Congenital Cardiovascular Disease

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Objective: To compare the demonstration accuracy of fetal cardiac chambers and great vessels by cardiovascular casting and prenatal echocardiography.

Methods: From March 2014 to June 2015, 18 fetal specimens prenatally diagnosed with congenital cardiovascular disease were enrolled in this study. Prenatal echocardiography findings of these 18 cases were reviewed and analyzed. Fetal cardiovascular cast models were made by injecting ABS perfusate via umbilical vein. All the cast models were carefully observed and analyzed, and cast findings were compared with prenatal diagnosis in overall level, atrioventricular level and great vascular level.

Results: In 18 cases, 94 abnormalities were diagnosed by prenatal echocardiography, including 48 atrioventricular abnormalities and 46 great vascular abnormalities. Eighteen fetal specimens were all successfully made into cast models. A total of 117 anomalies were detected in cast models, including 35 anomalies in atrioventricular level and 82 anomalies

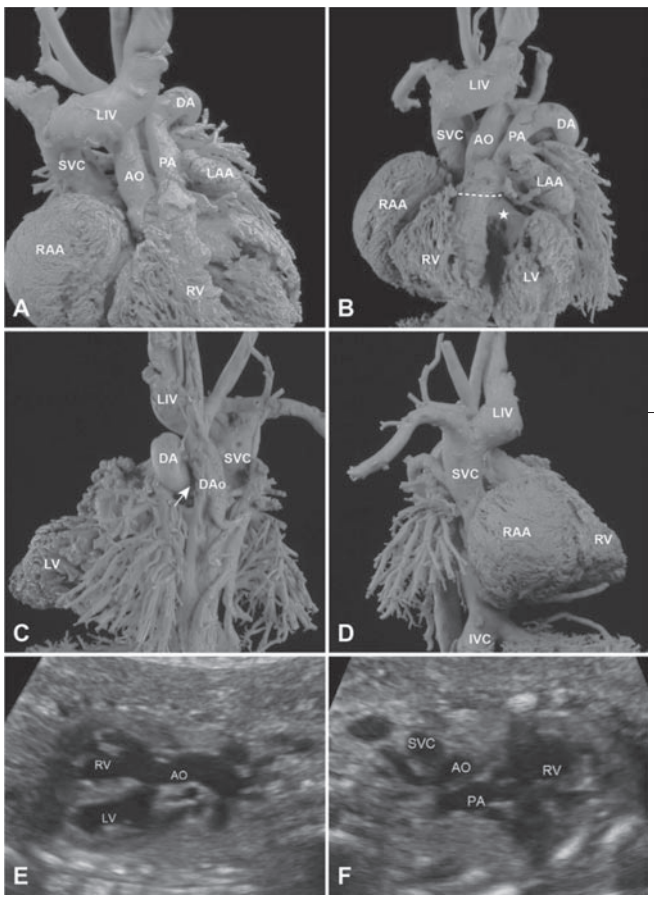

Figure 1. Cast demonstration of a fetus with double-outlet right ventricle (DORV), ventricular septal defect (VSD), dilated and tortuous DA (Case 1). (A) Right anterior 45° view: AO and PA are both originated from right ventricle (RV). (B) Left anterior 45° view: The overriding ratio of aortic root is approximately 80-90%. The dotted line represents the position of aortic root. An abnormal connection between left and right ventricle indicates the existence of a VSD (white asterisk). (C) Posterior view: A dilated and tortuous DA connects PA and the left posterior wall of DAo(white arrow). (D) Right side view: SVC, IVC and LIV connect to right atrium. (E) Prenatal echocardiography showed an overriding aorta (overriding ratio: 80-90%) and a large VSD. (F) Prenatal echocardiography showed PA originated from RV.

AO, aorta; DA, ductus arteriosus; DAo, descending aorta; IVC, inferior vena cava; LAA, left atrial appendage; LIV, left innominate vein; LV, left ventricle; PA, pulmonary artery; RAA, right atrial appendage; RV, right ventricle; SVC, superior vena cava.

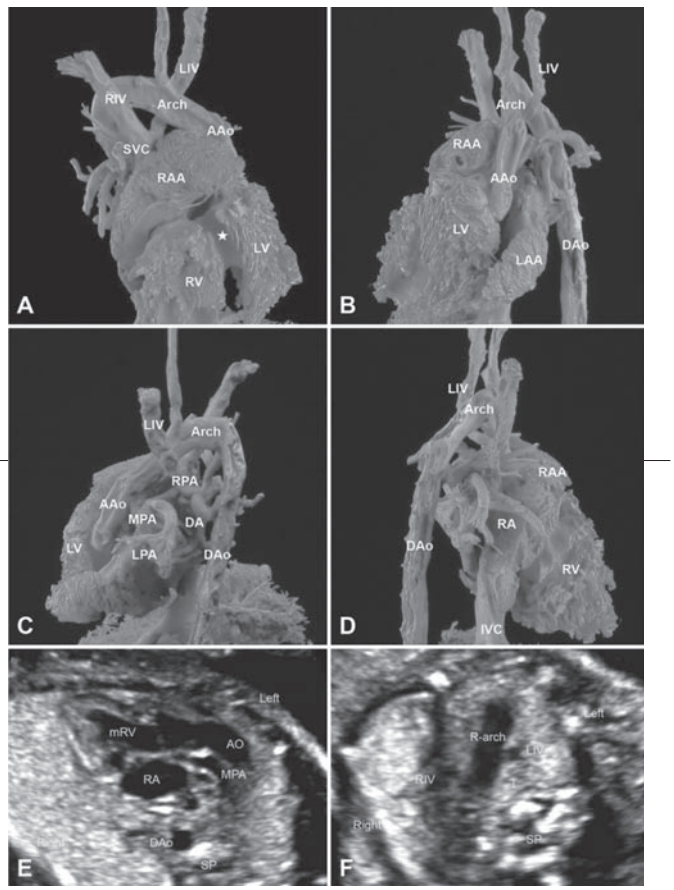

Figure 2. Cast demonstration of a fetus with VSD, right aortic arch, subaortic LIV, anomalous DA connection, etc. (Case 2). (A) Anterior view: An abnormal connection between ventricles indicates the existence of a large ventricular septal defect (white asterisk). Subaortic LIV is detected coursing anomalously under the aortic arch. (B) Left side view: Ascending aorta (AAo) is originated from the left lateral border of LV. (C) Left posterior 45° view: DA anomalously connects DAo and RPA. (D) Right side view: Aortic arch abnormally coursed from left-anterior to right-posterior, confirming a right aortic arch. (E) Prenatal echocardiography showed dextroversion of the heart, AO and MPA both originated from mRV, pulmonary valvular atresia and PA stenosis. (F) Aortic arch located on the right side of trachea and subaortic LIV was mistakenly identified as LSVC in the prenatal sonography.

AAo, ascending aorta; Arch: aortic arch; DA, ductus arteriosus; DAo, descending aorta; IVC, inferior vena cava; LAA, left atrial appendage; LIV, left innominate vein; LPA, left pulmonary artery; LV, left ventricle; MPA, main pulmonary artery; RA, right atrium; RAA, right atrial appendage; RIV, right innominate vein; RPA, right pulmonary artery; RV, right ventricle; SVC, superior vena cava.

ABSTRACTS

Abstracts for Free Paper Session:

PAEDIATRIC CARDIOLOGY II

in great vascular level. When comparing the sonographic results and cast findings, we found 65 abnormalities were identified by both methods, including 29 and 36 abnormalities in atrioventricular and great vascular level, separately. There were 65 misdiagnosis in prenatal echocardiographic findings, which were corrected or added by casts, including 12 atrioventricular abnormalities and 53 great vascular abnormalities. However, there were also 18 malformations observed by fetal echocardiography could not be demonstrated in the cast models, including 16 atrioventricular malformations and 2 great vascular malformations.

Conclusion: Fetal cardiovascular cast has more advantages in demonstrating anomalies of great vessels and their branches, but has some limitations in displaying intracardiac abnormalities. Cast models may help to understand the anatomic structure and spatial relationship of fetal congenital cardiovascular disease, which plays a vital role in prenatal diagnosis and clinical management.

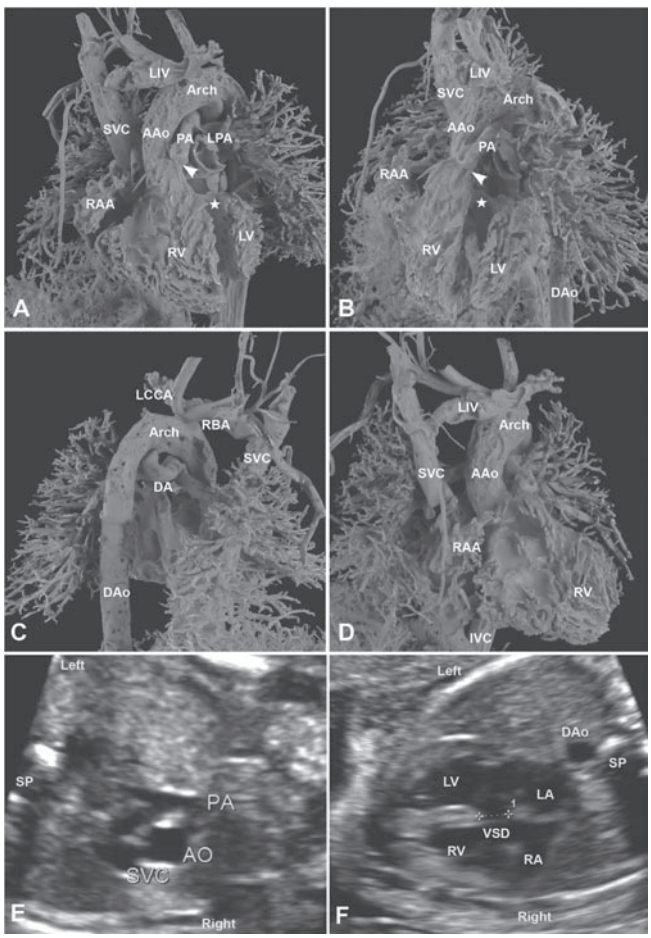

Figure 3. Cast demonstration of a fetus with hypoplastic left heart syndrome (HLHS), double outlet right ventricle (DORV), pulmonary valve atresia (PVA), pulmonary artery stenosis (PAS), ventricular septal defect (VSD), etc. (case 10). (A) Left anterior 30° view: AAo and PA are both originated from RV. A disconnection between RV and PA indicates the pulmonary valve atresia (white arrowhead). (B) Left anterior 45° view: Pulmonary trunk and left/right pulmonary artery are narrowed. An abnormal connection between RV and hypoplastic LV suggests a ventricular septal defect (white asterisk). (C) Right posterior 45° view: A tortuous DA connects PA and DAo. RBA and LCCA have a common trunk in the initial segment. (D) Right side view: Dialted AO anomalously originated from RV. (E) Prenatal echocardiography showed pulmonary stenosis. (F) A large VSD was showed in the prenatal sonography.

AAo, ascending aorta; Arch: aortic arch; DAo, descending aorta; MPA, main pulmonary artery; LPA, left pulmonary artery; DA, ductus arteriosus; SVC, superior vena cava; IVC, inferior vena cava; LIV, left innominate vein; LV, left ventricle; RV, right ventricle; LAA, left atrial appendage; RAA, right atrial appendage; LCCA, left common carotid artery; RBA, right brachiocephalic artery.

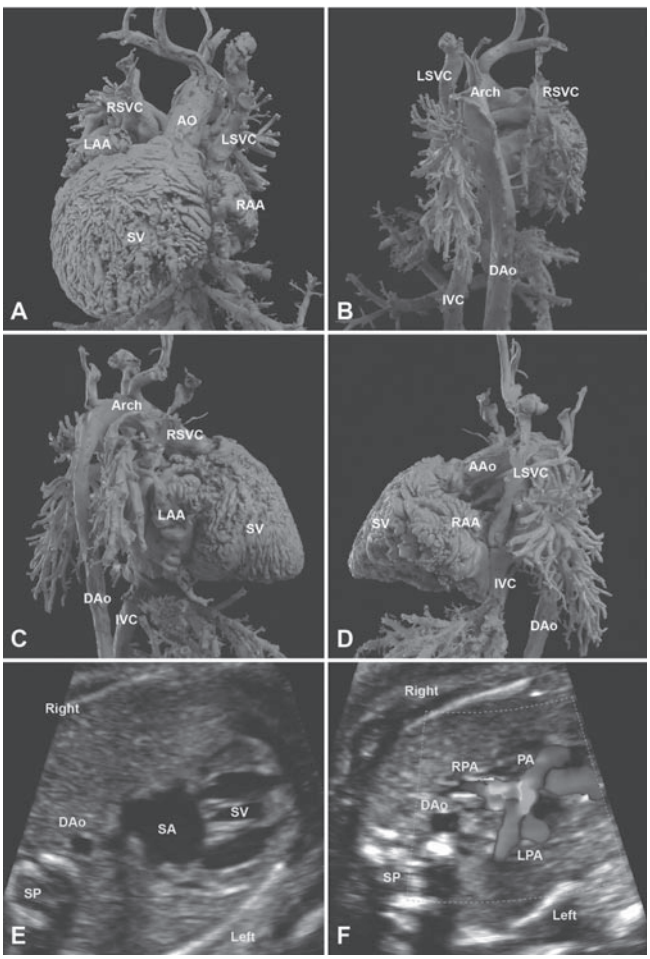

Figure 4. Cast demonstration of a fetus with atrial situs inversus, common atrium, single ventricle (SV), persistent left superior vena cava (LSVC), etc. (case 11). (A) Anterior view: The enlarged AO is originated from single ventricle. The left and right SVC are both connected with the common atrium. (B) Posterior view: DAo locates in the right side, while IVC locates in the left. (C) Right side view: A finger-like LAA locates in the upper right of SV. (D) Left side view: A triangle-like RAA locates in the upper left of SV. IVC and LSVC connect to the left side of common atrium. (E) Prenatal echocardiography showed a single atrium and single ventricle. (F) Prenatal echocardiography showed pulmonary stenosis.

AO, aorta; Arch: aortic arch; DAo, descending aorta; LSVC, left superior vena cava; RSVC, right superior vena cava; IVC, inferior vena cava; SV, single ventricle; RV, right ventricle; LAA, left atrial appendage; RAA, right atrial appendage.

ABSTRACTS

Abstracts for Free Paper Session:

PAEDIATRIC CARDIOLOGY II

Outcomes of Transcatheter Occlusion of Patent Ductus Ateriouses in Infants ≤6 Months

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Objectives: We sought to analyze the outcomes of transcatheter patent ductus arteriosus (PDA) occlusion using a variety of devices in infants ≤6 months and discuss the transcatheter occlusion indication of PDA in early infants.
Methods: We performed a retrospective analysis of children ≤6 mouths in whom transcatheter PDA occlusion was attempted between January 2002 and November 2014 at West China Second University Hospital.
Results: A total of 72 patients underwent successful transcatheter device closure. The mean age at catheterization was 4.9±1.8 months (1-6 months) with a mean weight at catheterization of 5.1±1.9 kg (1.9-6.7 kg), the mean PDA diameter of 3.9±0.8 mm (1.8-5.3 mm), the mean systolic pulmonary arteriosus pressure of 55.7±8.9 mmHg (46-79 mmHg). Among these suffered infants, companied with 72 cases of growth retardation, 48 cases of recurrent lower respiratory tract infection, 35 cases associated with congestive heart failure, and 5 cases of respirator-oxygen-dependent. 4/6-8/10 PDA occluder was selected for transcatheter device closure, and intraoperative blood transfusion were performed in 46 cases. All subjects resulted with occluder position in good shape, no residual shunt; whileas 16 cases with aortic blood flow velocity increased slightly, 12 cases with left pulmonary artery blood flow velocity increased slightly just post-operation. And in follow-ups the increased velocity of and pulmonary blood flow gradually returned to normal. Follow-up data showed, all subjects resulted good outcomes with growth significantly improved, congestive heart failure cured and repeated lower respiratory tract infection significantly reduced postoperative.
Conclusions: In experienced heart center, percutaneous closure of PDA should be considered even in infants ≤6 months. The indications include PDA infants with respirator-oxygen-dependent, congestive heart failure, and recurrent lower respiratory tract infection and growth retardation. Children underwent PDA occlusion would result with improved growth and development, recovered heart function and less lower respiratory tract infection.

ABSTRACTS

Abstracts for Free Paper Session:

PAEDIATRIC CARDIOLOGY II

One Case of Right Atrial Haemangioma: Prenatal Diagnosis and Treatment Strategy

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The most common cardiac tumors of fetus are rhabdomyoma, teratoma and fibroma. Cardiac hemangioma is one of the rarest types of cardiac tumors and is usually diagnosed postnatally. We present here a fetus with such a large right atrial hemangioma diagnosed in-utero with fetal echocardiography (Figure 1), and further characterized with magnetic resonance imaging (MRI) (Figure 2) at 30 weeks' gestation in December 2015 which is normal at 24 weeks' gestation. With the use of fetal echocardiography, a large mixed echogenic mass protruding outward from the right atrial wall was observed. Moderate amounts of pericardial effusion were also found. Then we checked the tumor periodically by fetal echocardiography and detected which grow rapidly, obstruct the inflow of the right ventricle and cause bradycardia. The treatment time and strategy were formulated by obstetrics, pediatric cardiologist, pediatric cardiac surgeon and neonatologist immediately. Because of possibility of hemodynamic instability of fetal, at 32 weeks of gestation, the women underwent a cesarean section to terminate the pregnancy. The pediatric cardiac surgeon open the male fetus's pericardium and put catheter to drainage of pericardial effusion before clamp the cord (Figure 3). Three days later the rumor was removed on account of hemodynamic instability (Figure 3). The hemangioma was confirmed by the pathologic examination (Figure 4). In the follow-up, the male baby had normal cardiac structure and function (Figure 3). Though this case, our aim is to investigate the sonographic feather of a cardiac hemangioma and make prenatal diagnosis become possible. Once a fetal cardiac hemangioma is suspected, tumer size, cardiac size, rhythm disturbances, intra-cardiac masses leading to obstruction, extra-cardiac masses and secondary effusions leading to tamponade and or fetal hydrops should be checked periodically. Through fetal echocardiography one can gain insight into the altered fetal pathophysiology that can occur during development, which will allow for potential fetal intervention or preparation for postnatal intervention. In addition, the cardiac surgery before clamp the cord is the first case in China which is of certain value in the development of fetal cardiac surgery.

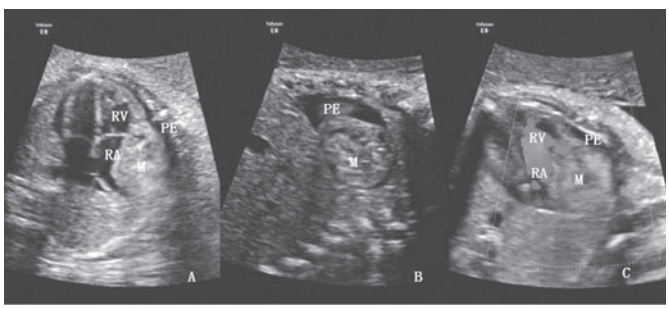

Figure 1. Fetal echocardiographic image. (A, B): 2D imaging shows a mixed echogenic mass arising from the wall of right atrium. Apparent pericardial effusion is present; (C): Color flow imaging show slight obstructive inflow of the right ventricle, but could not show blood flow in the mass.
RV, right ventricle; RA, right atrium; M, mass; PE, pericardial effusion.

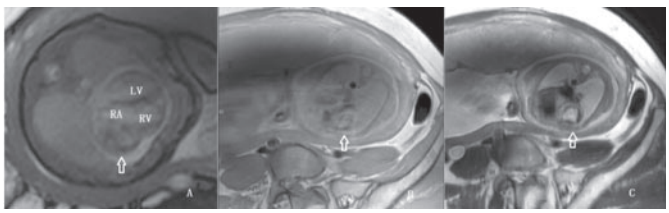

Figure 2. Fetal magnetic resonance imaging (MRI). (A): MRI shows a mass with a broad base of attachment arising from the wall of right atrium, that with apparent pericardial effusion; (B): Slightly hypotensity on T1WI; (C): Hyperintensity on T2WI.
RV, right ventricle; RA, right atrium; LV, left ventricle.

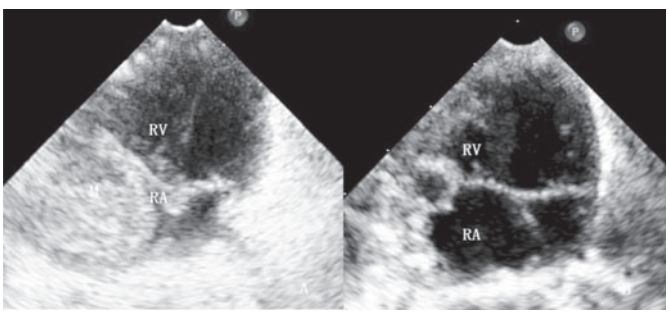

Figure 3. Postnatal echocardiographic image. (A): After Pericardiectomy; (B): After right atrial mass resection.
RV, right ventricle; RA, right atrium; M, mass.

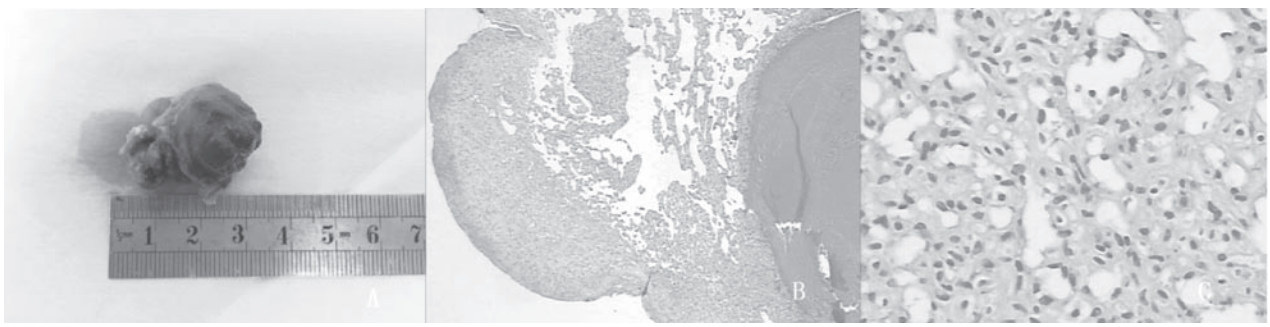

Figure 4. Right atrial mass. (A): Gross appearance; (B, C): Microscopic view.

ABSTRACTS

Abstracts for Free Paper Session:

PAEDIATRIC CARDIOLOGY II

Elevated Serum Level of Interleukin-27, Interleukin-10 and Interleukin-17A in Children with Kawasaki Disease

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Background: Kawasaki disease (KD) arises due to the disorder of the inflammation response and faulty immune regulation. Interleukin-27 (IL-27) is a novel cytokine with both pro-inflammatory and anti-inflammatory effects. The relationship between IL-27 and KD is unexplored and in this study we hypothesized that IL-27 is associated with the development of KD.
Methods: We obtained blood samples from 81 children with KD 24 hours (h) before intravenous immunoglobulin (IVIG) therapy. For experimental controls we also obtained blood samples from 20 children with an acute febrile infectious disease (febrile control, FC) and 27 healthy children (healthy control, HC). The serum levels of IL-27, Interleukin-17A (IL-17A) and Interleukin-10 (IL-10) were measured using enzyme linked immunosorbent (ELISA) assays.
Results: Patients with KD had higher serum levels of IL-27, IL-10 and IL-17A compared with FC and HC groups. Serum levels of IL-27 were higher in KD children diagnosed with coronary arterial lesions (CALs) than in children with KD but without CALs. These results imply a strong positive relationship between serum levels of IL-27, IL-10 and IL-17A in children with KD.
Conclusion: Our results indicated that increased serum levels of IL-27 is closely linked to the up-regulation of IL-10 and IL-17A in acute KD. Additionally, our observation that IL-27 serum levels are even higher in children with KD and CALs indicated that IL-27 may play an important role in the development of CALs in acute KD.

The Rare Cause of Heart Failure in Children: Infantile Hepatic Hemangioendothelioma

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Objective: Infantile hepatic hemangioendothelioma is a rare tumor in children and few can lead to congestive heart failure. This article summarizes the clinical features, treatment and prognosis of infantile hepatic hemangioendothelioma combined with congestive heart failure in children.
Methods: A retrospective analysis the clinical data of four children with infantile hepatic hemangioendothelioma combined with congestive heart failure in our institution from May 2013 to December 2015.
Results: Among four infants, 3 males and 1 female, mean aged of 86 days (21-155 days), the average weight of 4350 g (2750-6500 g), 2 cases were admitted because of abdominal swelling and respiratory distress, 1 case of abdominal swelling, jaundice, shortness of breath admission, and 1 case of a heart murmur, enlarged heart, and pulmonary hypertension. Two patients were associated with hemangioma and Kasabach-Merritt syndrome. Three cases were multiple liver hemangioma scattered in the left lobe and right lobe of the liver, and one case was solitary liver hemangioma scattered in the right lobe. Tumor size diameters were ranged from 2-10 mm. Four children had been used prednisone (1-2 mg/kg.d) and digoxin, dopamine, furosemide, spironolactone. Two cases were responded good to the therapy and followed-up for 2 years and 1 and a half years respectively, whose heart size, heart function and pulmonary hypertension became normal. One case with Kasabach-Merritt syndrome responded poor to the therapy. Two cases were experienced transcatheter hepatic arteriovenous fistula embolization, using coil occlusion of hepatic artery-venous fistula. The postoperative hepatic tumor volume was significantly decreased, and the heart function is improved. One patient was followed-up for 1 year and a half. The heart size, pulmonary hypertension and heart function returned to normal. One case is still under following-up. One case with Kasabach-Merritt syndrome was died from heart failure and severe infection before surgery. The mortality rate was 25%.
Conclusions: Infantile hepatic hemangioendothelioma is a rare cause of congestive heart failure in children. If heart failure is found unexplained in children, it should be actively abdominal ultrasound or CT examination in order to confirm the presence or absence of infantile hepatic hemangioendothelioma. The mortality rate in infantile hepatic hemangioendothelioma associated with congestive heart failure is very high. Early identification, early intervention, especially prednisone combined with transcatheter hepatic arteriovenous fistula embolization can significantly improve heart function, reduce the mortality and improve the prognosis of infantile hepatic hemangioendothelioma associated with congestive heart failure in children.

ABSTRACTS

Abstracts for Poster Presentations:

Permanent Pacing in a Premature Infant with Isolated Congenital Complete Atrioventricular Block: A Case Report

YT Pertiwi,[1] R Budi,[2] C Achmad,[1] R Sobarna,[3] A Purnomowati,[1] TM Aprami[1]
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Introduction: Congenital complete atrioventricular block (CCAVB) is a rare and potentially lethal disease with an estimated incidence of 1 in 15.000 to 20.000 live born infants. Most of the patients with CCAVB have structurally normal hearts, referred to as an 'isolated' CCAVB.
Case Presentations: We present the case of a premature infant with CCAVB who underwent implantation of a permanent pacemaker. The male infant was born at 33 weeks of gestation and weighed 2150 g. Repeat fetal ultrasound assessment before demonstrated fetal cardiomegaly increased at 30 weeks gestation. The decision was made to deliver the baby by cesarean section at 33 0/7 weeks gestation. After birth, the infant showed respiratory distress despite antenatal corticosteroid therapy. There were no clinical signs of hydrops fetalis. The heart rate ranged between 40 and 50 bpm. An electrocardiogram showed that the rate of P wave was 120 bpm and the rate of QRS wave was 50 bpm. The chest x-ray demonstrated dilated heart and echocardiogram showed dilated chambers, small non significant PDA with left to right shunt, no ASD or VSD, and satisfactory contracted ventricles. Respiratory problem was resolved after supportive treatment with temporary pacing. He underwent successful implantation of a permanent transepicardial pacemaker (VVIR mode, stimulation rate 120 bpm, output 1,5 mV and sensitivity 2,6 mA). A unipolar epicardial lead was used and the pulse generator was implanted in a pocket made under at the anterior rectus sheath. Surgery was performed without any complications. There was no respiratory problem associated with pacemaker implantations in the abdominal wall. He was discharged at the age of 31 days with a weight of 2350 g. At the 1-year follow up he remains in well condition without any complications.
Conclusions: We have reported a case of a CCAVB with succesful implantation of permanent pacemaker.

Inhibition of Histone Acetylation by Curcumin Reduces Alcohol-induced Fetal Cardiac Apoptosis

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[1]Heart Centre, Children's Hospital of Chongqing Medical University, China; [2]Children's Hospital of Chongqing Medical University, Ministry of Education Key Laboratory of Child Development and Disorders, China; [3]China International Science and Technology Cooperation Base of Child Development and Critical Disorders, China; [4]Chongqing Key Laboratory of Pediatrics, China; [5]Department of Biomedical Science, Charlie E. Schmidt College of Medicine, Florida Atlantic University, USA

Background: Prenatal alcohol exposure may cause cardiac development defects. It is known that alcohol can induce cardiac apoptosis and myocardium dysplasia, however the underlying mechanisms are not yet clear. Although, our previous studies have suggested that histone modification plays a vital role in alcohol induced fetal cardiac development abnormalities. This study investigates the phenomenon further, particularly by examining the effect of histone acetylation regulation mechanisms on alcohol induced cardiac apoptosis.
Methods and Results: C57 pregnant mice were exposed of alcohol using gavage. TUNEL assay revealed that positively stained cells were significantly higher in the alcohol group. Western blotting revealed that alcohol increases active-caspase-3 and active-caspase-8, whereas it reduces caspase-3, caspase-8 and bcl-2. Furthermore, we observed that alcohol exposure enhanced acetylation of histone H3K9 in embryonic hearts. ChIP assay showed that alcohol significantly increased the acetylation of histone H3K9 in the promoter of caspase-3 and caspase-8, and decreased the acetylation of histone H3K9 in the promoter of bcl-2. Through in vitro experiments, we found that alcohol treatment increased the expression of active-caspase-3, active-caspase-8 and the acetylation of histone H3K9, and decreased the expression of caspase-3, caspase-8 and bcl-2 in cardiac cells. Surprisingly, when we intervened cardiac cells with curcumin the up-regulation of active-caspase-3, active-caspase-8 and acetylation of histone H3K9, and the down-regulation of caspase-3, caspase-8 and bcl-2 were all reversed. Moreover, flow cytometry assay demonstrated that the high apoptosis level that was induced by alcohol in cardiac cells were down-regulated after curcumin treatment.
Conclusions: These findings indicate that histone modification may play an important role in mediating alcohol induced fetal cardiac apoptosis, possibly through the up-regulation of acetylation of H3K9 in the promoters of apoptosis genes. This study also shows that curcumin may reverse alcohol-induced fetal cardiac apoptosis, which provide further implications that curcumin is protective against alcohol abuse during pregnancy.

ABSTRACTS

Abstracts for Poster Presentations:

Pulmonary Nodules as an Uncommon Presentation in Kawasaki Disease

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Pediatric Cardiology Ward, Guangzhou Women and Children's Medical Center, China

A 2-year-old boy was admitted with a prolonged fever, bilateral bulbar conjunctival injection without exudate, red lips and truncal rash. Amoxycillin clavulonate had been prescribed without clinical response. Physical examination on admission was significant for irritability and mild cervical, epitrochlear, axillary, and inguinal lymphadenopathy. Laboratory studies showed an elevated C-reactive protein, anemia, thrombocytosis, an elevated erythrocyte sedimentation rate, sterile pyuria and normal liver enzymes. Microbial cultures (blood, pharyngeal swab) were negative for pathogenic specimens. Serologic tests for mycoplasma, chlamydia, cytomegalovirus, Epstein-Barr virus, influenza, parainfluenza, adenovirus and enterovirus were negative. Mantoux test, bone scan, bone marrow aspiration, rheumatoid factor, antineutrophil antibody, antineutrophil cytoplasm antibodies, antinuclear factor, and serum complements were negative or normal. Echocardiography performed on day 8 of illness revealed left coronary arteries dilation without aneurysms. Chest X-ray demonstrated bilaterally disseminated multiple pulmonary nodules 6 mm in diameter and ground-glass alterations. A lung CT scan showed numerous miliary nodules in diffuse and random distribution in both lungs. The patient was diagnosed with incomplete KD, and was treated with IVIG and aspirin. The infant was afebrile on day 14. A repeat chest X-ray on day 15 showed resolution of the pulmonary nodules. He was discharged on day 21 in good clinical recovery. An echocardiogram on day 18 was normal, as were follow-up echocardiograms 1, 2, 4 and 6 months after the acute stage of the disease.

Another Reason of Giant Coronary Artery Aneurysm in Children: Chronic Active Epstein-Barr Virus Infection

L Zhang, P Huang, ZP Wang, SL Xia, MH Yu, Y Xu, WG Hao
Department of Pediatric Cardiology, Affiliated Guangzhou Women and Children's Medical Center of Guangzhou Medical College, China

Objective: To improve our understanding that chronic active Epstein-Barr virus infection (CAEBV) may cause giant coronary artery aneurysm (GCAA).
Methods: To summarize and review the clinical data of a child with chronic active Epstein-Barr virus infection (CAEBV) complicated by virus-associated hemophagocytic syndrome and GCAA, Clinical features of similar cases from published literatures were summarized. All literatures were retrieved systematically.
Results: A 6-year-old Chinese girl was admitted to our hospital in March 2016 with an 18-day hepatosplenomegaly and 15-day fever history (up to 39.6°C). She also had a history of infectious mononucleosis sixteen months ago and improved after treatment with intravenous gamma globulin and ganciclovir. Physical examination on admission revealed marked hepatosplenomegaly and lymphadenectasis, and laboratory examination showed pancytopenia, liver dysfunction (alanine aminotransferase 105 U/L-189 U/L) and coagulation dysfunction (APTT 88.4s-129.3s, Fib 0.99 g/L-1.8 g/L). Peripheral blood lymphocyte increased, atypical lymphocyte >10%. VCA- IgM was negative, but other anti-EBV antibodies (VCA-IgG, EA-IgG and EBNA) were positive. The EBV genome was clearly detected (6.47×103 cps/ml-3.72×104 cps/ml) in the peripheral blood by PCR analysis. Transthoracic echocardiography showed giant right coronary artery aneurysm (8.2 mm, RGCAA) and left coronary artery aneurysm (5.7 mm, LCAA). Bone marrow biopsies revealed infiltration of numerous macrophages engaged in hemophagocytosis, clinically suggestive of CAEBV complicated by virus associated hemophagocytic syndrome with RGCAA and LCAA. The patient was treated with intravenous gamma globulin, ganciclovir, dexamethasone and cyclosporine. The fever resolved on the 2th day of dexamethasone therapy, but the hepatosplenomegaly and cervical lymphadenectasis persisted. On the fourteenth day in the hospital, an echocardiography showed the similar coronary artery change with no thrombosis.
Conclusions: (1) CAEBV may cause coronary lesion, especially giant coronary artery aneurysm which might have potential for thromboembolism and risk of acute myocardial infarction. (2) Once coronary artery lesions occurred, the patient's history should be carefully investigated and are classified according to risk strata. (3) Thrombolytic therapy is indicated when blood coagulation return to normal in CAEBV patients.

ABSTRACTS

Abstracts for Poster Presentations:

The Clinical Significance of ANCA in Kawasaki Disease

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Objective: To investigate the clinical significance of anti-neutrophil cytoplasmic antibody (ANCA) in patients with Kawasaki disease (KD).
Method: 472 patients with KD from January 1, 2014 to December 31, 2015 were divided into two groups according to the detection of ANCA, such as positive group and native group. The positive rate of ANCA, the sensitivity of intravenous immunoglobulin (IVIG) associated with ANCA and the relationships of ANCA with coronary artery lesion degree were analyzed.
Results: The positive rate of ANCA in patients with KD was 23.3%; The different of sensitivity to IVIG between positive group and negative group was not statistically significant (P>0.05); Though the correlations between coronary artery lesion and ANCA were not significant(X2=2.98, P=0.085, r=0.073), the difference of coronary artery lesion degree between the two group was statistically significant (P<0.05).
Conclusion: The positive rate of ANCA in patients with KD was low, and it lack of predictability for the coronary artery lesions and sensitivity of IVIG, and it is not as valuable as echocardiography to assess the degree of coronary artery lesion. Therefore, the detection of ANCA in patients with KD is lack of clinical significance.

Placental P-glycoprotein Inhibition Enhances Susceptibility to Di(2-ethyhexyl)phthalate Induced Cardiac Malformations in Mice

C Wang, KY Zhou, Y Zhang, YF Li, YM Hua
Department of Pediatric Cardiology, West China Second University Hospital, Sichuan University, China

Backgrounds: P-glycoprotein (P-gp) forms a functional barrier between maternal and fetal blood circulation in the placenta, thus protecting the fetus from exposure to xenobiotics during pregnancy. Our previous study has proved that maternal administration of Di (2-ethyhexyl) phthalate (DEHP, P-gp substrate) in pregnant mice could result in various fetal cardiac malformations.
Purpose: This study aims to explore whether inhibition of placental P-gp function with verapamil could enhance susceptibility to DEHP induced cardiac malformations in mice or not.
Methods: The pregnant C57BL mice were randomized into the vehicle group (n=10), the DEHP group (n=20, 1 g/Kg), the verapamil group (n=10, 3 mg/Kg) and the DEHP+verapamil group (n=20). Pregnant dams in different groups received respective interventions by gavage once daily from E6.5-E14.5. Maternal weights were monitored every day and samples were collected at E15.5. HE staining was used to examine fetal cardiac malformations. Fetal cardiac development-related genes (Nkx2.5/Gata4/Tbx5/Mef2c/Chf1) mRNA and protein expression were determined by quantitative real-time PCR (qRT-PCR) and western blot (WB), respectively. Maternal modality, maternal complete stillbirth/abortion rates and fetal cardiac malformations rates were also calculated.
Results: Maternal modality, maternal complete stillbirth/abortion rates and fetal cardiac malformations rates of DEHP+verapamil group were significantly higher than that of DEHP group, verapamil group and vehicle group. Compared with DEHP group, verapamil group and vehicle group, fetal cardiac Gata4/Mef2c/Chf1 expression was significantly down regulated in DEHP+verapamil group. There were no differences in above parameters between verapamil group and vehicle group.
Conclusions: Placental P-glycoprotein inhibition could enhance susceptibility to DEHP induced cardiac malformations in mice.

ABSTRACTS

Abstracts for Poster Presentations:

Implementing Transdisciplinary Approach to Cardiovascular Disease

SY Yau,[1] YL Cheung[2]
[1]Open University of Hong Kong; [2]Tuen Mun Hospital, Hong Kong

Purpose: Despite efforts have been put in preventing and treating cardiovascular disease, it is still one of the leading causes of high mortality worldwide. To address the situation, a transdisciplinary approach is introduced with the aim to address comprehensively the health hazard of cardiovascular disease. The purpose of the current study is to explore the effectiveness of adopting transdisciplinary approach to cardiovascular disease.
Methods: A systematic review was conducted to explore the effectiveness of adopting transdisciplinary approach to cardiovascular disease. Multiple databases were used to search the related articles. Data were categorized by thematic analysis and presented.
Results: The results showed that a variety of disciplines with different perspectives were collaborated in targeting cardiovascular diseases through transdisciplinary approach. The effectiveness was supported in several aspects including reducing the re-admission rate and enhancing the quality of life among the patients. In addition, the health care organizations were also benefited by better co-ordination of resources allocation, enhanced services provided in cardiovascular diseases related areas, and foster research collaboration among different disciplines.
Conclusion: Cardiovascular disease brings suffering to patients and cause overwhelming financial burden. With the effectiveness of applying transdisciplinary approach in treating cardiovascular disease for both patients and health care organizations, this approach should be considered as a kind of strategy in cardiovascular care.