Short-term effects of air pollution on acute myocardial infarction in Shanghai, China in 2013–2014

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OBJECTIVES Although particulate matter with diameter smaller than 2.5 μm (PM2.5) and 10 μm (PM10) and other pollutants have been associated with cardiovascular morbidity and mortality, the effect of pollutants on acute myocardial infarction (AMI) have rarely been addressed in Asia and Pacific Region, especially in Shanghai, China.

METHODS A total of 972 Emergency Medical Service-assessed and self/taxi-driving cases in Pudong District, Shanghai City between 1st November, 2013 and 27th April, 2014 were obtained from the Shanghai Emergency Medical Center Register. A case-crossover design was used to analyze exposure to air pollution and the risk of AMI. Exposure to PM2.5, PM10, nitrogen dioxide (NO2), sulphur dioxide (SO2) and carbon monoxide (CO) was defined as the mean urban background level. The associations of AMI admission, all above pollutants, temperature and relative humidity were analyzed by correlation and logistic regression.

RESULTS PM2.5, PM10 and CO in urban background were associated with an increased risk of AMI for all time windows, whereas NO2 and SO2 were not. The respective odds ratio (confidence interval) of PM2.5 for AMI was 1.16 (1.03-1.29), of PM10 was 1.05 (1.01-1.16), of CO was 1.08 (1.02-1.21), of NO2 was 0.82 (0.75-1.02), and of SO2 was 0.87 (0.63-1.95). With the increase of air quality index (AQI), more AMI occurrence were found. Of the time windows, there were more AMI patients between 6:00-18:00 and outdoor period. There was no correlation between fluctuation of temperature, relative humidity and AMI hospital admission.

CONCLUSIONS Short-term exposure to moderate-serious pollution is associated with an increased risk of AMI. The increase of PM2.5, PM10 and CO concentration has relation to the increase of AMI admission.

Pre-hospital Management in Chinese Patients with Acute Coronary Syndrome: Findings from the EPICOR Asia Study

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OBJECTIVES Contemporary pre-hospital management in Chinese patients with acute coronary syndrome (ACS) remains unclear. In this subanalysis of EPICOR Asia study, we report baseline pre-hospital management patterns of ACS patients in current real-world practice in China.

METHODS EPICOR Asia (NCT01261386) is a prospective, multinational, observational, cohort study to describe antithrombotic management patterns in Asian patients with ACS who survived to hospital discharge, including pre-hospital, hospital and post-discharge management. A total of 12,922 patients were enrolled from 218 centers in 8 countries or regions from 06/2011 to 05/2012, and 8,914 patients (5961[48.2%] STEMI, 1316[16.0%] NSTEMI, and 2938[35.8%] UA patients) were from 107 centers in China. This subanalysis was based on the Chinese population data.

RESULTS A pre-hospital electrocardiogram was done in 3,422 (41.7%) patients (52.0% of STEMI, 42.7% of NSTEMI, and 27.3% of UA patients). Pre-hospital medication was given to 503 (9.8%) patients (13.6% of STEMI, 12.2% of NSTEMI, and 3.6% of UA patients). Pre-hospital thrombolysis was given to only 1.0% of STEMI patients. The most commonly used antplatelet agents were aspirin (867 [10.6%] patients) and clopidogrel (801 [9.8%] patients) in total ACS patients. Pre-hospital aspirin and clopidogrel were given to 14.1% and 13.4% of STEMI, 11.6% and 11.1% of NSTEMI, and 5.3% and 4.2% of UA patients, respectively. A small percentage of patients received pre-hospital anticoagulant therapy, the most common of which was low-molecular-weight heparin.

CONCLUSIONS Pre-hospital management is more frequent in STEMI and NSTEMI patients than in UA patients. In-hospital initiation of antplatelet agents remains relatively infrequent. Improvement in the pre-hospital management of Chinese ACS patients is necessary.

Strategies for Patients with Acute Myocardial Infarction Presenting as Out-of-Hospital Cardiac Arrest

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OBJECTIVES Many patients with acute myocardial infarction (AMI) presented as out-of-hospital cardiac arrest (OH-CA). What are the best options for these patients? Which strategies would give them the best chance of full recovery?

METHODS 112 consecutive patients who presented to our institution from February 2011 to Dec 2013 with OH-CA and subsequently diagnosed to have AMI by electrocardiographic (EKG) criteria (ST segment elevation) or elevated serum troponin were included. Their characteristics (demographic information, past medical history, medication history, treatment history) and outcome were tabulated. Statistical analysis (Fisher’s exact test for categorical variables; two-sample t-test for continuous variables) were performed to find the variables which were associated with in-hospital survival.

RESULTS Out of 112 patients, 63(56%) were alive at discharge while 49(44%) died during hospitalization. The patients that survived to discharge were younger (59±11 years vs 65±9.5 years, p<0.0041). There was no difference in survival based on sex, body mass index or race. Previous history of cardiovascular disease, heart failure, revascularization, diabetes, hypertension, dyslipidemia, cigarette smoking did not significantly adversely affect survival to discharge. Patients already on aspirin, beta blockers, angiotensin-converting enzyme inhibitors, statin and warfarin did not have a survival advantage. Cardiac arrest pre-hospital, presence of shock at first medical contact, lower systolic blood pressures on presentation, higher initial serum troponin were associated with worse survival. Patients treated with therapeutic hypothermia fared worse than those patients that were not cooled, with 80% mortality in the hypothermia group compared to 20% mortality in the other group. The two methods of cooling for therapeutic hypothermia used in our institution did not significantly affect survival to discharge. Patients that underwent diagnostic coronary angiography and percutaneous coronary intervention (PCI) were more likely to alive at discharge. The type of stent- bare metal or drug-eluting did not confer a survival advantage.

CONCLUSIONS Patients with OH-CA who arrived to the hospital with acceptable blood pressure (no cardiogenic shock) and were able to undergo coronary angiography for PCI had higher chance for survival. Induced hypothermia did not improve the chance of survival.

Influence of platelet to lymphocyte ratio on short-term prognosis in patients with acute myocardial infarction

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OBJECTIVES To investigate the influence of platelet to lymphocyte ratio (PLR) on short-term prognosis in patients with acute myocardial infarction (AMI).

METHODS One hundred and thirty-five patients were divided into low PLR group (PLR<170, n=85) and high PLR group (PLR>=170, n=51) according to their PLR level, which was calculated according to blood platelet count and lymphocyte count on admission. Clinical data were collected in two groups of patients such as age, sex, smoking, diabetes, hypertension, hyperlipidemia, and reperfusion therapy. The differences of in-hospital mortality, angina readmission rate and 1-year mortality were compared between groups.

RESULTS There were no significant difference of clinical data such as age, sex, smoking, diabetes, hypertension, hyperlipidemia, and reperfusion therapy (P>0.05). Compared with the low PLR group,
there were higher in-hospital mortality (10.7% vs 5.9%, P < 0.05), higher angina readmission rate (28.6% vs 15.7%, P < 0.01), and higher 1-year mortality (9.6% vs 7.8%, P < 0.01) in AMI patients with high PLR.

CONCLUSIONS Patients with AMI and high PLR have relatively worse short-term prognosis than those with AMI and low PLR on admission.

GW26-e0743
Impact of Plaque Characteristics on Serial Coronary Artery Remodeling Response to Changes in Plaque Size: OCT and IVUS findings
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OBJECTIVES We hypothesize that the stage and underlying morphologic characteristics of atherosclerotic lesions will influence the vascular response to changes in plaque size. In this study, we analyzed baseline OCT and serial IVUS images to investigate the influence of baseline plaque characteristics on serial coronary remodeling in patients presenting with acute coronary syndrome (ACS).

METHODS One hundred and sixty seven ACS patients underwent both OCT and IVUS examination of a non-culprit lesion after percutaneously performed coronary intervention to the culprit lesion. All patients subsequently underwent repeat IVUS imaging at 12-month follow-up. According to the plaque characteristics, the slope (β) of the regression line relating EEM to plaques areas were compared by the Generalized Estimating Equations (GEE).

RESULTS The change in EEM area for each mm² change in plaque area (i.e. slope of the regression line) was greater for fibrous plaques compared to non-fibrous plaques but did not reach statistical significance (slopes: 1.48 vs. 1.04 mm², p = 0.061). There was a trend towards a smaller slope of the regression line in plaques with TCFAs compared to plaques without TCFAs (slopes: 0.89 vs. 1.30 mm², p = 0.070). Notably, there was a statistically significant difference in regression line slope between lesions with and without calcification, with calcified lesions showing less change in EEM area relative to change in plaque area (slopes: 0.67 vs. 1.47 mm², p < 0.001). The slopes were not significantly affected by the presence or absence of microvessels (p = 0.773), cholesterol crystals (p = 0.229), or macrophages (p = 0.950).

CONCLUSIONS The capacity for coronary artery remodeling in response to plaque progression or regression varies among lesions with different baseline characteristics. Lesions with OCT-identified features associated with early-stage atherosclerosis showed a more robust capacity for arterial remodeling compared to lesions with advanced-stage atherosclerotic features.

GW26-e0781
Hyperhomocysteinemia is an independent predictor of long-term clinical outcomes in Chinese octogenarians with acute coronary syndrome
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OBJECTIVES Large research programs have been focused on the identification of new risk factors to prevent CAD, with special attention to homocysteine (Hcy), due to the known associated increased atherosclerosis, oxidative stress status and endothelial dysfunction. However, controversy still exists on the association and prognostic value between Hcy and CAD. Therefore, aim of the current study was to investigate the prognostic value of Hcy in Chinese acute coronary syndrome (ACS) octogenarians undergoing coronary angiography (CAG).

METHODS We enrolled 660 consecutive ACS octogenarians who underwent coronary angiography and were classified into three groups according to Hcy tertiles. The baseline characteristics and Hcy level were significantly different among the three groups (p < 0.05). The Cox proportional hazards regression model shows that higher plasma level of Hcy is an independent risk factor for all-cause mortality (HR = 2.79, P = 0.007).

CONCLUSIONS Hyperhomocysteinemia is an independent predictor of long-term mortality and MACE of ACS octogenarians.

GW26-e1448
Prognostic Value of Pregnancy Associated Plasma Protein-A in Elderly Patients with non-ST Segment Elevation Acute Coronary Syndrome
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OBJECTIVES This study sought to investigate whether pregnancy associated plasma protein-A (PAPP-A) is useful for risk assessment in elderly patients with non-ST segment elevation acute coronary syndrome (NSTE-ACS).

METHODS PAPP-A was measured in 455 elderly patients with non-NSTE-ACS, Study and followed-up for 12 months. A cut point was according to the ROC curve, the patients were divided into high, intermediate and low level group, to evaluate the association between the PAPP-A and the incidence of the combined cardiovascular events.

RESULTS The cut point of PAPP-A was 23.5 IU/L, and the sensitivity and specificity of the incidence of 66.7% and 75.0% respectively. Multivariate logistic regression analysis demonstrates that there was a correlation between the PAPP-A level and rates of the combined cardiovascular events (OR = 2.83, P = 0.060). The Cox proportional hazards regression model shows PAPP-A is an independent risk factor for prognosis of the combined cardiovascular events (HR = 2.79, P = 0.007).

CONCLUSIONS PAPP-A was independently associated with recurrent cardiovascular events in elderly patients with NSTE-ACS. PAPP-A may be useful for risk assessment and monitoring in populations at high risk of cardiovascular events.

GW26-e3949
Preliminary Clinical Experience With domestic extracorporeal shockwave myocardial revascularization therapy in Treatment of refractory angina pectoris
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OBJECTIVES We aimed to evaluate the safety and efficacy of domestic JC-ESMR therapy for refractory angina pectoris.

METHODS JC-ESMR adopts the optimal density of energy treatment (0.09J/mm²), Electrocadiography(ECG) controlled shockwave release pulses are released only in refractory phase of the cardiac cycle. estimating the flexible, intelligent positioning system and Real-time monitoring system under echocardiography. Eighteen patients with medically refractory angina and no revascularization options were randomly divided into 2 groups. The control group (n = 8) received medical therapy. The treatment group(n=10) were treated with JC-ESMR (3 times a week at intervals of four weeks for a total of three months, nine treatments patient in total). Efficacy was assessed by CCS grading of angina, dosage of nitroglycerin, NYHA classification, as well as ischemic burden on pharmacological SPECT at 4 months after the last JC-ESMR treatment. Safety measures included ECG, troponin, creatine kinase, and pro-brain natriuretic peptide testing.

RESULTS The CCS grading of angina, dosage of nitroglycerin, NYHA classification were improved in treatment group compared to control group. The perfusion evaluated by SPECT has improved statistically significant compared to control group. The JC-ESMR therapy was performed safely without any adverse events in ECG, troponin, creatine kinase, and pro- brain natriuretic peptide.

CONCLUSIONS This study demonstrates the JC-ESMR is a safe, effective and non-invasive new treatment for patients with refractory angina pectoris. However, larger sham-controlled trials will be required to confirm the clinical utility of this novel therapy.