

# Cardiovascular issues

## **000009 - Multi-vessel revascularization is associated with less in-hospital mortality in cardiac arrest survivors with multi-vessel coronary artery disease: A multi-center cohort study**

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### **Introduction**

In patients with ST-elevation myocardial infarction (STEMI), several observational studies have demonstrated conflicting results on the recommendation of complete revascularization for multi-vessel coronary artery disease (CAD). Whether multi-vessel revascularization benefits the outcomes in patients successfully resuscitated from presumed cardiogenic arrest and diagnosed as multi-vessel CAD by emergent coronary angiography (CAG) also remains unclear.

### **Objectives**

The aim of this study is to evaluate whether multi-vessel revascularization following return of spontaneous circulation (ROSC) is superior than culprit-only revascularization in reducing in-hospital mortality and poor neurological recovery.

### **Methods**

Two hundred and seventy-three non-traumatic, adult (ages  $\geq 18$ ) cardiac arrest patients with sustained ROSC and underwent emergent coronary angiography (CAG) within 24 hours following cardiac arrest were retrospectively recruited from three hospitals from 2012 to 2017. Stenosis more than 70% of a single major coronary artery was considered significant. Seventy-two patients with non-significant coronary artery stenosis, seventy-four patients with only one coronary artery stenosis, and thirty-seven patients with failed percutaneous coronary intervention (PCI) were excluded. Stenosis more than 70% of a single major coronary artery was considered significant. Multi-vessel PCI was defined as revascularization of more than one major

vessel during the index CAG, and culprit-only PCI as revascularization of the infarct-related artery only. The primary outcome was in-hospital mortality. The secondary outcome was poor neurological recovery (cerebral performance category: 3-5) at hospital discharge.

## Results

A total of 90 patients were enrolled in the final analysis and classified into multi-vessel (n=45) and culprit-only (n=45) groups. There was no significant differences of baseline characteristics, CPR events, and post-arrest care between these two groups. Twenty-five patients (55.6%) in the culprit-only groups failed to survive to discharge while 17 patients (37.8%) in the multi-vessel group did (adjusted HR = 0.54, 95% CI = 0.28 – 0.98,  $p = 0.04$ ). There were 27 patients (60.0%) in the culprit-only groups discharged with poor neurological recovery while 25 patients (55.6%) in the multi-vessel group (adjusted OR = 0.89, 95% CI = 0.29 – 1.98,  $p = 0.78$ ). Consistent decrease of in-hospital mortality in patients receiving multi-vessel revascularization was noted across the subgroups including age, gender, underlying diseases, witnessed collapse, bystander cardiopulmonary resuscitation (CPR), and the use of extracorporeal membrane oxygenation (ECMO) and intra-aortic balloon pump (IABP).

## Conclusion

Multi-vessel revascularization is associated with less in-hospital mortality as compared with culprit-only revascularization in patients suffering from cardiogenic arrest and multi-vessel CAD.

# 000019 - Effects of vasopressor infusion versus fluid supplement on intestinal microcirculation in anesthesia-related hypotension

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## Introduction

Volatile anesthetics often result in hypotension during general anesthesia. Fluid supplement and vasopressors are frequently used to restore blood pressure. This

study investigated the effects of fluid supplement and vasopressor on intestinal microcirculation during treatment of isoflurane-related hypotension.

## Methods

This study was approved by our Institute Animal Care and Use Committee (No. 20130287), and 32 rats were randomly divided into 4 groups. The rats were anesthetized and prepared as described in our previous study [1]. After induction of the anesthesia with isoflurane, a tracheostomy was done, and rats were ventilated with either 0.8-1% isoflurane (group 1 [Sham]) or 1.5-1.8% isoflurane (group 2 [Control], hypotension), 3 [Fluid, hypotension + 0.9% saline], and 4 [Vasopressor, hypotension + norepinephrine]). The therapeutic goal of hypotension was to maintain the decrease of mean arterial pressure (MAP) less than 10 mmHg of its initial value. Intestinal microcirculation was examined by sidestream dark-field video microscopy (Microscan), and tissue oxygen monitor at different time points.

## Results

**Systemic Hemodynamics.** In repeated measurement analysis, MAP was lower in group 2 and 3 than in group 1. No significant difference in MAP was observed between group 1 and group 4. MAP at 240 min in each group was as follows: group 1, 108(9); 2, 85(5); 3, 97(5); and 4, 102(9) mm Hg. In repeated measurement analysis, heart rate did not differ significantly among the four groups. Heart rate at 240 min in each group was as follows: group 1, 391(50); 2, 339(36); 3, 365(43); and 4, 384(26) beats per minute.

**Microcirculation of Terminal Ileum.** Perfused small vessel density (PSVD) of mucosa was lower in group 2 than in group 1 and 4. No significant difference in PSVD of mucosa was observed between group 2 and group 3. Tissue oxygen saturation (StO<sub>2</sub>) of mucosa in group 2 were significantly lower than group 1 and group 4. StO<sub>2</sub> of mucosa did not differ significantly between group 2 and group 3.

Comparison of Terminal Ileum Microcirculation over 0, 120 and 240 Min							
Mucosa		0 min	120 min	240 min	Time	P value	
					Group	Interaction	
PSVD	1	29.3 (3.0)	27.8 (2.3)	27.0 (2.3)	0.001	0.004	0.111
	2*#	26.7 (2.9)	22.4 (3.3)	22.3 (4.2)			
	3	27.5 (3.3)	24.5 (5.4)	26.2 (3.2)			
	4	28.4 (1.9)	27.9 (3.3)	28.9 (2.5)			
StO <sub>2</sub>	1	64 (5)	63 (6)	62 (4)	< 0.001	< 0.001	0.199

	2*#	59 (5)	50 (8)	49 (5)			
	3	58 (6)	50 (4)	48 (7)			
	4	61 (3)	57 (3)	57 (6)			

\* p < 0.05 vs group 1, # p < 0.05 vs group 4 by repeated measurement.

## Conclusion

During treatment of isoflurane-related hypotension, intestinal microcirculation was resuscitated by use of vasopressor but not by the fluid supplement.

# 000053 - Increase Survival of Patient With Type-A Aortic Intramural Hematoma without urgency operation

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## Introduction

Intervention based on initial blood pressure (BP) control and strict surgical indications may increase survival in patients with type-A aortic intramural hematoma (IMH-A). We report our clinical experience of using this new strategy to determine whether its use corresponded with a decrease in patient mortality.

## Methods

We included patients diagnosed as having IMH-A in the emergency department at our medical center and undergoing intensive blood pressure (BP) control (systolic BP < 110 mmHg) and strict to surgical indications. Data including patient demographics, clinical outcome, surgical procedure details, and medical treatment were collected. Follow-up was performed at 3 and 6 months to assess patient mortality and morbidity.

## Results

During 2006–2016, 93 patients with IMH-A were included (45 men, 48 women; average age, 66 ± 11 years; average IMH-A size, 9.36 ± 5.48 mm); group one, 36 were treated using intensive BP control with strict surgical indications, whereas 57

were not as group two. Binary logistic regression analyses of mortality revealed significantly higher odds ratios (95% confidence intervals) for age, sex, surgical intervention, and group [0.88 (0.808–0.962),  $p = 0.005$ ; 15.462 (1.533–155.20),  $p = 0.020$ ; 8.412 (1.269–55.757),  $p = 0.027$ , and 8.579 (1.044–70.489),  $p = 0.045$ , respectively.

## Conclusion

The mortality rate was lower among our IMH-A patients who received intensive BP control with strict surgical indications. Therefore, for patients with acute IMH-A and stable hemodynamic status, initial treatment with intensive BP control and proper indications for surgical repair can reduce mortality.

# 000081 - The influence of Sacubitril/Valsartan on cardiovascular disease and all cause mortality in heart failure with reduced ejection function patients with or without diabetes

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## Introduction

Patients with diabetes have an increased risk of developing heart failure. The patients with heart failure are at higher risk of developing diabetes.

In previous studies shows that diabetes increased the risk of cardiovascular mortality by 1.5 to 4 fold based on different studies data.

The association of diabetes and congestive heart failure have notably worse prognosis. However, there were still limited publications about long-term outcomes of sacubitril/*valsartan* in diabetic patients with congestive heart failure. The aim of this study is to compare the long-term outcome of sacubitril/*valsartan* in congestive heart failure patients with or without diabetes mellitus.

Patients with diabetes have an increased risk of developing heart failure. The patients with heart failure are at higher risk of developing diabetes. Previous studies showed that diabetes increased the risk of cardiovascular mortality by 1.5 to 4 fold.

## Objectives

The association of diabetes and congestive heart failure have notably worse prognosis. However, there were still limited publications about long-term outcomes of sacubitril/*valsartan* in diabetic patients with congestive heart failure. The aim of this study is to compare the long-term outcome of sacubitril/*valsartan* in congestive heart failure patients with or without diabetes mellitus.

## Methods

The data of consecutive patients received sacubitril/*valsartan* in patients with congestive heart failure was collected from 2016 to 2018. Total 196 patients with congestive heart failure were included in this study. The patients were divided into two groups: control group (N=113) and diabetic group (N=83).

## Results

The male ratio was 73.45% in control group (N=83) and 73.49% in diabetic group (N=61) ( $p=0.9947$ ). The patients in diabetic groups were older than control groups ( $65.94 \pm 13.44$  vs  $61.52 \pm 16.01$ ;  $p=0.0426$ ). There was no difference of BNP ( $1623 \pm 2606.1$  vs  $1404.3 \pm 1358.5$  pg/mL;  $p=0.6828$ ) and high-Sensitivity CRP ( $4.61 \pm 6.49$  vs  $4.21 \pm 5.61$  mg/dL,  $p=0.7818$ ) between control and diabetic groups. During 2.5 years follow up, there was no difference of myocardial infarction (0% vs 2.41%,  $p=0.0972$ ), stroke, heart failure readmission rate (1.77% vs 1.20%,  $p=0.7502$ ) and total mortality rate (3.54% vs 6.02%,  $p=0.4151$ ) between patient without diabetes and diabetic groups.

## Conclusion

This 2.5-year follow up study demonstrated that sacubitril/*valsartan*, in both congestive heart failure patients with and without diabetes mellitus, had low myocardial infarction, stroke, heart failure readmission rate and all cause mortality.

# 000082 - Intra-operative Extracorporeal Cardiopulmonary Resuscitation During Non-cardiac surgery: Experience from a Single Medical Center

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## Introduction

The role of extracorporeal membrane oxygenation (ECMO) has been used increasingly in patients with refractory cardiopulmonary failure unresponsive to conventional treatment in recent two decades. However, the use of ECMO in adults who received ECMO-cardiopulmonary resuscitation (ECPR) for refractory cardiac arrest during non-cardiac surgery is rarely reported.

## Objectives

We evaluated the clinical outcome of adult patients who were supported by ECPR during non-cardiac surgery when conventional CPR failed.

## Methods

We analyzed all the adult patients who received ECPR between March 2001 and June 2016 from our hospital ECMO registry. The primary outcome is the survival rate of hospital discharge with a cerebral performance category of 1 or 2. The secondary outcomes are the overall survival and the successful ECMO weaning rate.

## Results

A total of 19 adults supported by venous-arterial ECMO during non-cardiac surgery were identified (14 male); mean age 55.9 years old. The leading cause of intraoperative ECPR was hemorrhagic shock (9 cases, 47%). The other causes were pulmonary embolism, acute myocardial infarction, loss of airway, cardiac tamponade, tension pneumothorax, and anaphylactic shock. 58% of these causes were surgical related. ECMO was successfully weaned in 11 patients (58%), among whom 3 patients died and 8 patients (42%) were discharged alive. Five of the survivors (26%) were in a good neurological function. The survivors noted to have a lower ASA physical status ( $p < 0.05$ ).

## Conclusion

Patients suffered from intraoperative cardiac arrest is a unique group of intra-hospital cardiac arrest patients. More than half of the causes were surgical-related. Therefore better surgical planning and closer collaboration between surgeons and anesthesiologists are important to prevent cardiac arrest and prepare to resuscitate patients, especially patients with high ASA PS classification. Cardiac arrest was witnessed in operating room and CPR was started immediately, ECMO team was summoned if traditional CPR failed. In our study, 42% of the adults survived to hospital discharge, and 26% of the intraoperative ECPR patients recovered with a good neurological outcome.

# 000090 - Effect of positive end-expiratory pressure on central venous pressure in patients with different elastic resistances of chest wall

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## Introduction

Central venous pressure (CVP) is an indicator of circulatory volume and cardiac function, but for patients under mechanical ventilation (MV), effect of positive end-expiratory pressure (PEEP) on CVP in patients with different chest wall elastic resistances ( $E_{cw}$ ) is still unknown.

## Objectives

To investigate the effect of PEEP on CVP of patients with different elastic resistances of chest wall.

## Methods

In this prospective study, patients under mechanical ventilation were evaluated with the aim of assessing the effect of PEEP change on CVP. According to the median of ratio of chest wall elastic resistance to respiratory system elastic resistance ( $E_{rs}$ ), patients were divided into high chest wall elastic resistance group ( $E_{cw}/E_{rs} > 0.28$ ) and low chest wall elastic resistance group ( $E_{cw}/E_{rs} \leq 0.28$ ). PEEP was set at 5, 10, 15 cmH<sub>2</sub>O respectively and CVP, heart rate, blood pressure and respiratory mechanics were recorded.

## Results

Seventy mechanically ventilated patients with CVP monitoring were included in the study from November 2017 to December 2018. The mean age all included patients was  $63.9 \pm 15.4$  years and the percentage of male patients was 62.9%. There were no differences in age, BP, HR, baseline PEEP, P/F and respiratory compliance between two groups. CVP elevated according to the increase of PEEP in two groups ( $P < 0.05$ ). When PEEP was 5, 10 and 15 cmH<sub>2</sub>O, the CVP in high chest wall elastic resistance group was  $8.65 \pm 2.42$  cmH<sub>2</sub>O,  $10.40 \pm 2.40$  cmH<sub>2</sub>O and  $12.60 \pm 2.47$  cmH<sub>2</sub>O ( $P < 0.05$ )



respectively, and the CVP in low chest wall elastic resistance group was  $9.46\pm 3.26\text{cmH}_2\text{O}$ ,  $10.76\pm 2.97\text{cmH}_2\text{O}$  and  $12.50\pm 2.80\text{cmH}_2\text{O}$  ( $P<0.05$ ) respectively. As PEEP increased, CVP of high Ecw/Ers ratio increased significantly when compared with that of low Ecw/Ers ratio ( $\Delta\text{CVP}$  (PEEP  $10\text{cmH}_2\text{O}$ -PEEP  $5\text{cmH}_2\text{O}$ ):  $1.75\pm 0.79$  vs.  $1.31\pm 0.80$ ,  $P=0.038$ ;  $\Delta\text{CVP}$  (PEEP  $15\text{cmH}_2\text{O}$ -PEEP  $10\text{cmH}_2\text{O}$ ):  $2.21\pm 1.25$  vs.  $1.71\pm 1.05$ ,  $P=0.041$ ;  $\Delta\text{CVP}$  (PEEP  $15\text{cmH}_2\text{O}$ -PEEP  $5\text{cmH}_2\text{O}$ ):  $3.96\pm 1.47$  vs.  $3.01\pm 1.56$ ,  $P=0.012$ ).

## Conclusion

For patients under mechanical ventilation, the increase of PEEP will cause the increase of CVP, and the increase of CVP in patients with high Ecw/Ers ratio is more significant.

# 000092 - Comparison of long term outcome after Bioresorbable Scaffolds in patient with Acute Coronary Syndrome and Stable Angina

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## Introduction

The bioresorbable material of the stent frame with the capability of providing mechanical support and drug-delivery functions have been developed to attempt to improve long-term outcomes. However, there are still limited publications about long-term outcomes of bioresorbable scaffolds (BRS) amount acute coronary syndrome (ACS) patient in Asia.

## Objectives

This study is to investigate the long-term outcome of bioresorbable scaffolds placement between ACS and stable coronary artery disease (CAD) patients.

## Methods

The data of BRS placement of consecutive patients receiving percutaneous coronary intervention was collected from the cardiovascular center in a single tertiary medical center from 2014 to 2017. The ACS and stable CAD groups were analyzed.

## Results

A total of 138 cases were included during 3.5 years follow up. The mortality rate between ACS and CAD was 2.5% and 1.5%. The cause of 3 mortality patients did not derive from coronary artery disease. There was one patient suffering from acute myocardial infarction (1.2%) in the CAD group. The overall ratio of target lesion restenosis was 3.6% and the ratio of target vessel restenosis was 2.9%.

## Conclusion

This study demonstrated that BRS placement in ACS patient had no significant difference cardiac cause mortality and major cardiovascular event compared with stable CAD at long-term follow up.

# 000096 - The establishment of ambulance 12-lead electrocardiography system: 8-year experience in Taiwan

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## Introduction

Pre-hospital ambulance 12-lead electrocardiogram (ECG) was shown to improve efficiency of treatment in patients with ST-elevation myocardial infarction (STEMI). There are only paramedics in Taiwan pre-hospital ambulance system without physicians. Furthermore, to set up pre-hospital ambulance ECG system requires the cooperation among multiple hospitals, fire bureau and department of health and training of paramedics. However, it remained a challenging issue to establish pre-hospital ambulance 12-lead electrocardiogram system in Taiwan.

## Objectives

The aim of this 8-year study is to improve prehospital STEMI care via establishment of pre-hospital ambulance 12-lead electrocardiogram in Taiwan.

## Methods

Since 2012, Kaohsiung City is first city to establish pre-hospital ambulance ECG system in Taiwan. After first successful city experience, most Taiwan cities or counties gradually start to set up prehospital ECG system. There were several key issues in Taiwan pre-hospital ECG system, including ambulance prehospital mobile transmit ECG system, intelligent ECG interpretation system, incentive strategies and auditing system.

## Results

There were 1, 2, 4, 7, 9, 13, 16 and 18 cities or counties, which established ambulance ECG system in 2012, 2013, 2014, 2015, 2016, 2017, 2018 and 2019. Five of 18 cities or counties had incentive strategies and 9 cities or counties (50%) had auditing system for prehospital ECG system. Total 299 ECG system were established in 263 fire bridges. There were  $16.6 \pm 30.2$  ECG system and  $14.6 \pm 25.0$  fire brigades equipped with ECG system per cities or counties. In total, 7470 ECG signals were transmitted via ambulance system and 332 patients with STEMI were diagnosed using ambulance. There were  $415.0 \pm 1030.9$  ECG transmission and  $27.7 \pm 55.3$  patients with STEMI diagnosed by pre-hospital ECG system per cities or counties.

## Conclusion

This 8-year study showed increase established of pre-hospital ambulance ECG system in Taiwan cities or counties. The STEMI diagnostic rate of ambulance ECG system around 4.4% per ECG in Taiwan. However, most cities or counties had only limited fire brigades.

# 000104 - Intra- aortic balloon pump induced venous oxygen saturation changes after cardiac surgery

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## Introduction

Background: Changes in central venous saturation (ScVo<sub>2</sub>) in cardiac surgery had been suggested to address the overall outcome that is linked to the sufficiency of circulatory functions. However the intra-aortic balloon pump (IABP) influence in this context had not been elucidated before. We aimed to identify the IABP-induced venous saturation changes in patients with impaired left ventricular function (LVF).

## Objectives

Insertion of intra-aortic balloon pump (IABP) is carried out after cardiac surgery in order to support low cardiac output syndrome (LCOS).

Optimization of cardiac output and oxygen delivery may decrease morbidity and reduce length of stay following cardiac surgery.

We hypothesize that IABP may itself induce changes in in the ScvO<sub>2</sub>. We aimed to identify IABP-induced ScvO<sub>2</sub> changes in patients with impaired left ventricular function (LVF).

## Methods

Changes in central venous saturation (ScVo<sub>2</sub>) in cardiac surgery had been suggested to address the overall outcome that is linked to the sufficiency of circulatory functions. However the intra-aortic balloon pump (IABP) influence in this context had not been elucidated before. We aimed to identify the IABP-induced venous saturation changes in patients with impaired left ventricular function (LVF)

## Results

Both groups were matched with respect to age, ejection fraction (EF) %, and hemoglobin and arterial saturation (SaO<sub>2</sub>) in blood gases. Patients with IABP have a trend toward higher ScvO<sub>2</sub>, which was significant in three out of seven samples screened from admission (71.47±12.5 versus 63.5±9.3, 68.3±12.6 versus 60.1±9.5, and 62.69±10.8 versus 55.63±8.1, p=0.04, 0.05, and 0.03 respectively)

## Conclusion

In this study we found that patients with IABP had higher venous saturation in comparison with the matched group with moderately impaired left ventricular function after coronary revascularization. These results need to be addressed

in interpreting ScvO<sub>2</sub> data after cardiac surgery, especially when it is linked to outcome measures

# **000079 - Blood pressure or flow: which best relates to the prognosis of patients with pulmonary arterial hypertension-A meta-regression analysis of randomized controlled trials**

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## **Introduction**

Pulmonary arterial hypertension (PAH) is a rare but severe disease characterized by soaring pulmonary vascular obliteration and pulmonary artery pressure that ultimately leads to heart failure and death. The progression of PAH can be mitigated by proper medications and lifestyle modifications. The appropriate treatment for pulmonary hypertension are usually guided by variable clinical indicators, but their prognostic values have not been systematically examined.

## **Objectives**

We conducted this systematic review and meta-regression analysis to review existing clinical trial evidence and compare the predictive power of hemodynamic parameters (including mean pulmonary artery pressure, mPAP; pre-capillary pulmonary vascular resistance, PVR; right ventricle cardiac output index, CI) to predict outcome in patients with primary PAH or PAH associated with connective tissue diseases or associated with congenital systemic to pulmonary shunts.

## **Methods**

We searched and identify all relevant studies from MEDLINE, PubMed, Embase, and the Cochrane Library were searched for randomized controlled trials (RCTs) that evaluated any PAH-specific medications in the treatment of PAH patients including the above-mentioned hemodynamic parameters. The drug classes of RCTs included in this study were ERA, PDE5, PDGFR, Prostacyclin, Prostacyclin+ERA, Rho-kinase, TXSI/TXRA, and sGC. There is an analogous R square index to quantify the proportion of variance explained by the predictors in meta-regression analysis, which is mainly used to assess its association with the prognostic status of PAH patients, including 6 minute walk distance (6MWD), all adverse events of hospitalization and death.

## **Results**

A total of 21 trials for the PAH treatment was included in the analyses, with a combined sample size of 3,594 individuals. The meta-regression analysis found that mPAP, PVR, and CI were significantly associated with 6MWD and all adverse events of hospitalization and death among PAH patients with analogous R square value (R<sup>2</sup>) were between 0.41 and 0.91. For 6MWD, the variable with the highest explanatory power was PVR (R<sup>2</sup>=0.68), the highest explanatory power for all adverse events was obtained with mPAP (R<sup>2</sup>=0.91), and for total mortality of PAH patients, parameter with the highest explanatory power was PVR (R<sup>2</sup>=0.53).

## Conclusion

Our meta-regression analysis revealed that pulmonary artery pressure, vascular resistance and right ventricle cardiac output were significantly associated with the prognosis of PAH patients; among them, mPAP and PVR index have a slightly better predictive effect on clinical outcomes of PAH patients than CI. These hemodynamic parameters have the potential to be good surrogate intermediate endpoints for PAH and can be used as reference indicators for outcome prediction to help physicians monitor patient conditions and arrange the most appropriate follow-up treatment plan by adopting evidence-based perspective in clinical decisions.

# 000097 - Synergic Effect of Dipyridamole and Clopidogrel on Stroke Prevention and Long Term Outcomes in Aspirin Intolerance Patients with Acute Myocardial Infarction and Previous Stroke

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## Introduction

Synergic effect of dipyridamole and clopidogrel on stroke prevention and long-term outcomes in aspirin intolerance patients with acute myocardial infarction and previous stroke is unknown.

## Objectives

The nationwide study analyzed the impact of dipyridamole and clopidogrel on secondary stroke prevention and long-term outcomes in aspirin intolerance stroke patients after acute myocardial infarction.

## Methods

This is a nationwide, case-control study of 186,112 first AMI patients, 78,607 of whom have previous history of cerebrovascular accidents. In final analysis, 4,637 patients taking clopidogrel and 208 patients using clopidogrel and dipyridamole were included.

## Results

The 12-year survival rate was no difference between clopidogrel and clopidogrel-dipyridamole groups (log-rank  $P = .6247$ ). There was no difference of event-free survival in stroke (log-rank  $P = .6842$ ), gastrointestinal (GI) bleeding (log-rank  $P = .9539$ ) or intra-cerebral hemorrhage (ICH) (log-rank  $P = .6191$ ). Dipyridamole did not make a contribution to AMI survival (HR = 0.98; 95% CI: 0.84-1.15). Dipyridamole has no benefit in any subgroup regardless of gender, age (under or over 75 years old), comorbidities, percutaneous coronary intervention, or medications.

## Conclusion

There was no difference of 12-year survival rate between clopidogrel and clopidogrel-dipyridamole groups. Two groups have balanced event-free survival in recurrent stroke, ICH, GI bleeding, and myocardial infarction.

# 000126 - Increasing of Survival in the Congenital Cardiac Surgery with the Support by the ECMO

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## Introduction

Mechanical circulatory support has an important role in the care of children with cardiac or pulmonary failure. There are two forms of mechanical circulatory support used in neonate or children, the extracorporeal membrane oxygenation (ECMO) and the ventricular assist device (VAD). Post-cardiac surgery myocardium stunning with the subsequent cardiac failure was an indication for ECMO set up. And the post-op mortality rate ranged from 30 to 60% in the previous studies.

## Methods

This retrospective study included 45 ECMO patients hospitalized at VGHKS between January 2006 and June 2018. The mean patient age was 383.83 (day). All these ECMO set-up patients were received cardiac surgery found to have low cardiac output status. There were 34 patients weaned off ECMO successfully and others did not. Postoperative complication included temporary or permanent neurologic injury, pulmonary failure, liver failure, acute renal injury, and ischemic limbs.

## Results

The overall mortality rate of these 45 patient received ECMO insertion was 37.78%. The average body weight of these patients was  $7.1 \pm 11.0$  Kg. The length of the ECMO used was  $106.0 \pm 78.2$  hours. After analysis by logistic regression, the risk factor of mortality was acute renal failure within 3 days of operation. Age, the length of ECMO used and body weight were not associated with patient's mortality.

## Conclusion

In the era without ECMO, all these kinds of patients deemed to die without cardiac support. In our study, we found that above 60% of children supported by ECMO could survive after the critical surgery. Therefore, we suggest that ECMO can be set up in the children received cardiectomy found to have low cardiac output aggressively.

# 000129 - Patterns of Left Ventricular Systolic Dysfunction after hanging injury

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## Introduction

During critical care after hanging injury, cardiac dysfunction is one of uncommon complications. To our knowledge, characteristics and predictors of this dysfunction remain undetermined.

## Objectives

To evaluate patterns of cardiac dysfunction after hanging injury and investigate factors associated with the dysfunction.

## Methods

Seventy-one patients who underwent echocardiography after hanging injury between July 2008 and January 2018 were enrolled in this single-center retrospective cohort study. Data were collected from hospital medical records including echocardiographic, electrocardiographic, and laboratory results. Echocardiography was performed less than 3 days after hanging injury. Contingent upon the occurrence of left ventricular systolic dysfunction (LVSD) after hanging injury, study populations were categorized as “LVSD (+) group” and “LVSD (-) group”. Study populations with LVSD were also categorized as cardiac arrest (CA) group or non-CA group based on the occurrence of cardiac arrest.

## Results

Twenty-six patients (36.6%) had LVSD after hanging injury. There were significant differences in serum CK-MB, and troponin I between LVSD (+) and LVSD (-) groups ( $p < 0.001$  and  $p < 0.001$ , respectively). Of these patients, 18 patients (69.2%) experienced cardiac arrest and 8 patients (30.8%) did not. The most common pattern of LVSD in CA group was global hypokinesia (61.1%) while the most common pattern in non-CA group was takotsubo cardiomyopathy (75.0%). In multivariate analysis, troponin I elevation was associated with the occurrence of LVSD (odds ratio, 16.37; 95% confidence interval, 3.05-87.85). AUC of troponin I for a prediction in occurrence of LVSD was 0.750.

## Conclusion

After hanging injury, most common pattern of LVSD in CA group was global hypokinesia while the most common pattern in non-CA group was takotsubo cardiomyopathy. The elevation of troponin I may be useful to predict the LVSD after hanging injury.

# 000132 - Accuracy of 0-3 hour change of high-sensitivity troponin T in a cohort of non-ST-segment elevation myocardial infarction

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## Introduction

The accuracy of the 0-3 hour high sensitivity troponin T delta change has not been widely validated in the real world settings. We aimed to compare the relative or absolute change of high-sensitivity troponin T between 0 hour and 3 hour for rule in and rule out MI (myocardial infarction) in a cohort presenting with suspected MI.

## Methods

All patients admitted to the ED or hospital floor of National Taiwan University Hospital between May 2016 and December 2016, after the introduction of hs-cTnT, who had symptoms suspected of MI and received hs-cTnT test at presentation and 3 hour were eligible for inclusion. Patients with ST-elevation myocardial infarction that could be diagnosed directly from presenting ECG were excluded from analysis. The final diagnosis of NSTEMI was adjudicated by two cardiologists. The overall discrimination of 0-3 hour delta hs-cTnT value in differentiating NSTEMI from other causes of chest pain were evaluated by ROC curve analysis. Sensitivity and specificity of absolute and relative 0-3 hour hs-cTnT change at different cut points were calculated.

## Results

A total of 510 patients were eligible for inclusion, of which 108 (21.2%) were finally diagnosed with NSTEMI. The median 0-3 hour delta change of hs-cTnT was 59.68 (Interquartile range, 6.2,195.2) for NSTEMI patients and 6.11(IQR -5.72,39.33) for non-MI patients. The area under the ROC curve for delta hs-cTnT in diagnosing NSTEMI was 0.68 (95% CI: 0.61,0.74) for overall patients, 0.68(0.61,0.75) after exclusion of patients with end-stage renal disease (ESRD), and 0.69(0.62,0.76) after further exclusion of patients with congestive heart failure (CHF). There was no significant difference of AUC in these three groups of patients. Using absolute change cutoff at 5, 20, 50 100 ng/L, the sensitivity for rule out NSTEMI was 93.83%, 80.25%, 65.43%, 44.44%, respectively. Using relative change cutoff at 5, 20, 50 100 %, the sensitivity for rule out NSTEMI was 88.89%, 60.49%, 50.62%, 33.33%, respectively.

## Conclusion

A absolute 0-3 hour delta change of Hs-cTnT < 5 ng/L has a higher sensitivity than a relative change of 5% in ruling out NSTEMI in a patient population comprising ESRD and CHF patients.

# 000161 - Roles of B-type Natriuretic Peptide in Predicting Left Ventricular Dysfunction and Survival Prognosis in the Early Post-resuscitation Phase

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## Introduction

Post-resuscitation myocardial dysfunction has been implicated in the survival prognosis of the patients initially resuscitated from cardiac arrest (1). B-type natriuretic peptide (BNP) is a useful seromarker for congestive heart failure and myocardial dysfunction.

## Objectives

This study aimed at evaluating the role of BNP in predicting the left ventricular (LV) dysfunction and survival outcome in the early post-resuscitation phase.

## Methods

Adult patients resuscitated from out-of-hospital cardiac arrest were enrolled in a prospective registry. BNP and echocardiography were evaluated at the 6th hour post-resuscitation. BNP was analyzed in correlation to the LV function using the Pearson correlation method. ROC curve was employed for finding the cut-off value of BNP in predicting survival prognosis. Survival curves of the patients were then stratified and plotted, and analyzed by the log-rank test.

## Results

Forty-eight patients (30 males and 18 females, mean age  $71.7 \pm 17.5$  years old) were included during a 16-month study period. The BNP level at the 6th hour post-

resuscitation was significantly correlated with the LV ejection fraction at the same time point ( $r = -0.451$ ,  $P = 0.008$ ). The survival outcome of the patients with BNP  $\geq 400$  pg/ml was significantly worse than those  $< 400$  pg/ml (log-rank  $P < 0.05$ ).

## Conclusion

BNP can serve as a useful seromarker of post-resuscitation myocardial dysfunction and survival prognosis in the early post-cardiac arrest phase.

# 000183 - The 1-minute interval of defibrillation can promote more successful defibrillation than 2-minute interval

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## Introduction

Current cardiopulmonary resuscitation guidelines recommend performing defibrillation every 2 minutes during resuscitation. However, the chance of successful defibrillation might be reduced as time goes by.

## Objectives

This study was conducted to compare the rate of successful defibrillation followed by defibrillation interval of 1 minute (T1) or 2 minutes (T2).

## Methods

Twenty-six pigs were randomly assigned to T1 or T2 groups. After induction of ventricular fibrillation (VF), we observed pigs for 2 minutes without any intervention. Thereafter, basic life support was started with 30:2 compression-to-ventilation ratio for 8 minutes. Defibrillation was performed by energy of 2 J/kg at 10 minutes after VF and repeated every 1 or 2 minutes according to randomization result. Advanced cardiac life support including continuous chest compression with ventilation every 6 seconds and intravenous injection of 1 mg epinephrine every 3 minutes were performed until the return of spontaneous circulation (ROSC) or 20 minutes after VF induction. Hemodynamic parameters and baseline arterial blood gas profiles were

compared between groups. ROSC, 24-hour survival and neurologic deficit score (NDS) were evaluated at 24 hours.

## **Results**

The hemodynamic parameters during resuscitation and baseline arterial blood gas profiles were not different between groups. ROSC was more frequently observed in T1 group ( $p=0.047$ ). Time to ROSC was shorter in T1 group, but there was no statistical difference between groups ( $p=0.054$ ). The rate of 24-hour survival and NDS at 24 hours were not different between groups.

## **Conclusion**

The 1-minute interval of defibrillation can promote more successful defibrillation than 2-minute interval.

# **000191 - Mechanical Chest Compression Devices during transport after Out-of-Hospital Cardiac Arrest in Korea: A national observational study from 2014 to 2016**

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## **Introduction**

The aim of our study was to compare the performance of mechanical chest compression device (meCC-device) and manual chest compression during transport after out-of-hospital cardiac arrest (OHCA) in Korea during the years 2014 through 2016.

## **Methods**

This study was conducted with use of the national cardiac arrest registry of OHCA patients with presumed cardiac etiology. The primary exposure was that emergency medical service (EMS) provider used meCC-device while transporting OHCA patients to emergency department. The primary end point was good cerebral performance

category (CPC 1 and 2) at discharge. We compared survival and neurological outcomes between mech-device group and manual chest compression group. We additionally conducted the before and after implementation study on the basis of the beginning of each ambulance station's meCC-device use.

## **Results**

Among 48,080 patients following OHCA with presumed cardiac etiology, meCC-device was used 1.6% (755) patients. After adjusting for possible confounders, patients who received meCC-device had no significant differences compared to manual chest compression on good neurological recovery (AOR 1.06 (95% CIs 0.59-1.92)) and for survival to discharge (AOR 1.18 (95% CIs 0.81-1.72)). There was no difference in the study outcomes when subgroup analysis the ambulance station which was actively using (more than 2 times and 10times) the meCC -device.

## **Conclusion**

The meCC-device that constantly maintains the chest compression rate and depth showed no better study outcomes in this study. It is necessary to overcome the weak point in using the meCC-device through training for EMS providers