1

Effect of Early Versus Late Discharge on Short-Term Clinical Patient Outcomes After Coronary Artery Bypass Surgery

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Background: Protocols that encourage earlier discharge of patients who have had CABG have been implemented across the United States. Delivery of efficient care benefits both patients and providers, premature discharge can adversely affect clinical outcomes, resulting in increased hospital readmissions and higher long-term costs. This study compared the effects of early and late hospital discharge on post-coronary artery bypass graft (CABG) patients at the Phillipine Heart Center from August 2007 to August 2009 on rates of mortality and re-admissions. **Methods**: We examined the post-operative length of stay in 147 patients who underwent CABG from August 2007 to August 2009 at PHC. Patients' charts were reviewed at the Medical Records Section and Medtrak System. Patient characteristics associated with early discharge as well as rates of mortality and re-admission were likewise determined. **Results**: Among 147 study patients, 73 patients were discharged early. There was a significant association between post-operative length of stay and control of hypertension (p= 0.003) and diabetes (p= 0.002) as well as the ejection fraction (p= 0.003). Lower rates of death (p= 0.001) and re-admission (p= 0.063) were likewise observed in the early discharge group. **Conclusion**: This study shows evidence that early discharge among post CABG patients was better compared to longer post-operative stays in terms of mortality and re-admissions 60 days after discharge.

2

The Comparative Effects of Statin on Total Cholesterol, Triglycerides, and HDL Levels Among Patients with Dyslipidemia at the Philippine Heart Center

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Background: The advent of cardiovascular diseases and modern advancement in therapy, clinicians are currently rediscovering the importance of preventive medicine. One of the most studied worldwide is the effect of statins in the over-all morbidity and mortality of dyslipidemic patients. Little data is available locally, and the comparative effects of different statins on each component of the lipid profile, especially high-density lipoprotein (HDL) have not been fully analyzed. **Methods:** A cohort of patients seen at the Hypertension Clinic (Preventive Medicine Department) and in selected private clinics of the Philippine Heart Center were selected for the study. The subjects were asymptomatic hypertensive patients with newly diagnosed dyslipidemia and were prescribed statins (Atorvastatin, Rosuvastatin, or Simvastatin). Their lipid profile was checked within 3-6 months of therapy, and individual effects were compared. **Results:** A total of 277 subjects were included in the study, and only 233 were analyzed. 108 subjects were given Simvastatin while 79 subjects were given Atorvastatin. Only 46 patients were given Rosuvastatin. Total cholesterol decreased by 11.9% in the Atorvastatin group, 10.1% in the Simvastatin group, and 21.2% in the Rosuvastatin group. Triglycerides decreased by 24.9% in the Atorvastatin group and 23.5% in the Rosuvastatin group. Triglycerides increased by 1.7% in the Simvastatin group. HDL levels failed to increased in both Atorvastatin and Simvastatin group, but increased by 0.06% in the Rosuvastatin group which was not statistically significant. LDL-cholesterol levels decreased by 22.1% in the Atorvastatin group, 22.7% in the Rosuvastatin group, and only 10% in the Simvastatin group. **Conclusion:** There is greatest reduction of total cholesterol levels among patients treated with Rosuvastatin as compared to patients given Atorvastatin and Simvastatin. Triglyceride levels were reduced to the same extent in patients given Atorvastatin and Rosuvastatin, but increased in the Simvastatin group. Comparable changes in LDL levels were seen in the Atorvastatin and Rosuvastatin groups, with less improvement observed in the Simvastatin

improvement observed in the Simvastatin group. There was no significant change in HDL levels among all groups.

3

Value of Coronary Calcium Scoring for Stroke Prediction Following Coronary Artery Bypass Grafting

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Background: Stroke incidence in post CABG patient is about "1-5% and accounts for 21% of the post operative mortality". Different risk factors responsible for the occurence has been determined with different studies. A strong association among the studies was the presence of an atherosclerotic aorta as a strong predictor of post CABG stroke. This study utilized non-invasive method to document the correlation between calcium score and risk for stroke patient undergoing CABG. The need for a screening tool to determine those patients who have the risks for post operative neurological complications could help the clinicians formulate the next best option for these patients, the kind of surgery that be used whether off pump or not. **Methods:** This is a cohort study. Patients aged 19 and above, admitted for CABG between June 2008 and December 2009 were included in the study and underwent plain cardiac CT scan for determination of calcium scores. Coronary calcification was calculated using the method previously described by Agatston, et.al. Patient were followed up during and after undergoing coronary artery bypass grafting to determine any stroke or neurologic changes. Those presenting with signs of stroke were confirmed using cranial CT scan. **Results:** The baseline characteristics of patient undergoing coronary artery bypass graft showed that majority are male (81.6%) and female (18.4%). The majority of these patients belong to is the 41-69 years of age. Hypertension and Diabetes Mellitus are the most common co-morbid conditions. The calcium score of >400 was noted in 34 patients Stroke occured in 7 of the 71 patients in which 5 (71.4%) of these had calcium score >400 (p value of 0.35). The sensitivity and specificity showed 71.4% and 47.0% respectively. The positive predictive value is 12.5% while negative predictive value is 93.9%. The relationship of stroke occurence and chest x-ray finding of calcification showed a significant difference with a p value of 0.02. Sensitivity was 85.7% with a specificity of 57.6%. The positive predictive value is 17.6% while NPV is 97.4%. **Conclusion:** The atherosclerotic and calcific load in patients undergoing CABG does not translate to their stroke events. Coronary calcification adds little to our ability to predict risk. A significant association were seen in the chest x-ray findings of calcification and occurence of stroke among patients (p value = 0.02)

4

N-Terminal Pro-Brain Natriuretic Peptide as Predictor of Mortality in Patients with Acute Coronary Syndrome

Marife Lanayan-Mejias, MD; Arthur Ferrolino, MD

Background: Biochemical markers for diagnosis and prediction of major adverse cardiac events in patients with Acute Coronary Syndrome (ACS). Advances in our understanding of the pathogenesis and consequences of Acute Coronary Syndrome have stimulated the discovery of new biomarkers that will help to restratify and treat ACS patients. This study aims to determine the prognostic value of NT pro BNP as a predictor of mortality in patients with Acute Coronary Syndrome. It specifically aims to determine specificity and sensitivity of NT pro BNP as marker for the occurence of mortality in post ACS patients. **Methods:** Patient admitted at Philippine Heart Center diagnosed with Acute Coronary Syndrome were included in this cohort study starting February 2009 until July 2009. Venous blood samples were extracted on admission for NT pro BNP level determination

and analyzed by Cobash 232 instrument. The primary end point of the study was the occurence of death during hospitalization, at 30 days from the index chest pain, and 6 months thereafter. Follow-up was performed thru outpatient visits of patients and thru telephone interview. Patients were divided into quartiles on the basis of their NT pro BNP levels. Means were expressed with 1 SD for continuous variables. Differences in categorical baseline variables between quartiles was evaluated with x^2 tests for trend. Differences between mean or median values for continuous variables was evaluated with either 1-way ANOVA or Kruskal-Wallis tests, as appropriate. **Result:** A total of ninety-three patients were enrolled in the study from February 2009 to July 2009. Of these, twenty- eight patients (30%) presented with ST elevation MI, fifty-one patients (54%) with non ST elevation MI and fourteen (15%) presented with unstable angina. A total of seventeen patients died, eleven of which, died while still admitted, the other six (6) died post discharge. The in-hospital mortality eleven patients (12%) had a linear correlation of the value of NT pro BNP level (p value of 0.001) and with sensitivity of 45.5% and specificity of 86.6%. After a median follow-up of 6 months, seven patients died (8%). The observed linear pattern of relationship of the level of NT pro BNP in mortality was also noted post discharged. Computed sensitivity and specificity, were 33.3% and 87.8% respectively. As expected, total mortality also increases with increasing value of NT pro BNP. However also noted is that the overall sensitivity and specificity of NT pro BNP levels in predicting the mortality of patient in short and long follow-up term in ACS patient, showed increasing specificity of NT pro BNP with increasing quartile value of 37.3%. Group 2 (NT pro BNP of 1500 pg/ml- 2250pg/ml) to 88.0%. Group 4 (NT pro BNP >3000pg/ml) while its sensitivity decreases with increasing values as shown by 100% sensitivity in Group 2(NT pro BNP value of 1500 pg/ml -2250pg/ml) to 41.2% on Group 4 (NT pro BNP >3000pg/ml). **Conclusion:** This study confirmed the previous observation published in the different studies regarding the use of NT pro BNP as predictor of short term and long term mortality of ACS patient. It showed a trend of increasing mortality rate with increasing value of NT pro BNP, therefore, it is a good predictor of mortality.

5

C Reactive Protein: Predictor of 6 Month Outcome in Patients with Acute Myocardial Infarction Undergoing Primary Coronary Intervention at the Philippine Heart Center

Arlyn P. Miranda, MD

Background: Determination of CRP concentration has been viewed as a possible method of further refining risk stratification among patients with acute myocardial infarction. Earlier work suggested a prognostic association between increase CRP levels and outcome after myocardial infarction. It has been recognized as a strong independent predictor of short term and long term mortality after acute coronary syndrome. Studies have shown that CRP is strongly associated with short term major adverse cardiac event in patients with acute myocardial infarction treated with primary PCI. However, limited studies have been conducted correlating CRP levels with outcomes after PCI. Assuming that the CRP level is a marker for the intensity of post-infarction outcomes. This study will be done with the intent of demonstrating the importance of CRP level in predicting the outcome after 6 months in patients with acute myocardial infarction who undergo PCI. **Methods:** This is a prospective cohort study A total of 65 patients admitted with Acute Myocardial Infarction who underwent primary PCI between January, 2008 to February 2009 at the Philippine Heart Center was included in the study. Blood samples for CRP was obtained before coronary angiography. Records of patients after PCI were reviewed and an interview carried out through phone or personally were done after one month, 3 and 6 months post PCI to determine the patient's outcome. Data was expressed as mean ± SD. Statistical analysis was done using the Chi–square test for categorical variables, T-test for continuous variables and Mann Whitney U Test for ordinal variable. Statistical significance was established at $p < 0.05$. The Kaplan Meier method was used for cumulative survival analysis. **Results:** Between January 2008 and February, 2009, we prospectively investigated and recruited 65 patients between the ages of 25 to more than 80 years old who presented with Acute Myocardial Infarction

and underwent PCI in the Philippine Heart Center. Most of the patients are above 50 years old with a mean age of 56 and male (81.5%) Hypertension (61%) is the most prevalent among the risk factors. The mean CRP level before the procedure was 37.87mg/dl. The 6 months Major Adverse Cardiovascular Events (MACE) occurred in 24.6% of the patients, 13.8% developed the primary event. 6 patients was readmitted because of Unstable Angina and 3 of the patients had non cardiac causes as the reason for admission. 11% had a secondary events with Cardiac Dysrhythmia as the cause of death. CRP levels was higher in patients who developed MACE, however was not statistically significant (Unstable Angina p value 0.937, all cause mortality p value 0.065). Event free survival for the primary event was 87.9% after 3 months and 84.5% after the 5 month, while for the first and second month, 98.3% and 96.55%. Event free survival for the secondary events was 92% after one month and 89% after 2 months post PCI. Majority of patients died on the first month. **Conclusion:** High CRP is not associated with MACE 6 months post PCI. CRP cannot be used as a biomarker in daily clinical practice and cannot predict an accurate risk stratification for individuals at risk for MACE post PCI. There is no prognostic significance of elevated CRP beyond that is defined by traditional risk predictions after AMI.

6

Assessment of Right Ventricular Function by Selected 2D Echo Parameters in Rheumatic Heart Disease Patients with Mitral Stenosis with Magnetic Resonance Imaging as Gold Standard

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Background: This study was done to compare the validity of the following 2 D echo parameters (Ejection Fraction, TAPSE & TSAV) in assessing RV function in RHD patients with mitral stenosis with MRI as the gold standard. **Methods:** This is a cross-sectional study comparing the four diagnostic parameters in RHD patients with pure Mitral Stenosis in assessing right ventricular function. At an assumed sensitivity of TAPSE by Miller et al of 59% at confidence level of 95% and total width of confidence interval of 20% n ≥ 93. We use the following diagnostics modalities namely: Ejection Fraction by Simpson's, Tricuspid Annular Plane Systolic Excursion, Tricuspid Systolic Annular Velocity & Magnetic Resonance Imaging. 2 Echo Technician will perform the 2DED. Two orthogonal echocardiographic views from the apex & subcostal windows will be obtained to assess Simpson's RV EF. Tracing of the RV endocardium at end-systole & end diastole will be perform by either identifying opening & closing of the tricuspid valve or by visually by assessing the smallest & largest RV chamber size. The Simpson's rule method was used to determine the RV volumes & the RV EF was calculated by subtracting end systolic volume from end diastolic volume (EDV) divided by EDV: RV EF% = 100 X (EDV- ESV)/ EDV. Using the apical 4 chamber view, the M mode cursor will be place through the junction of the tricuspid valve plane & RV free wall. TAPSE is determined by the difference in the displacement of the RV base during systole & diastole. **Results:** Majority of patients are female with mean age of 36.9. Most of them are in Atrial fibrillation with mild pulmonary hypertension and normal LVEF. Mean SBP-97.93, DBP-66.4, HR-75.83 & RR-16.6. Nobody is hypertensive, diabetic & smoker. The RVEF is highly specific and least sensitive among the 3 parameters. The TAPSE is the most correlated with MRI among the 3 parameters. The TSAV is the highly sensitive but least specific among the 3 parameters.**Conclusion:** TAPSE is most correlated with MRI with a p value of 0.000. TSAV is the least correlated with a p value of 0.117.

7

Predicting Outcome of Catheter Balloon Valvuloplasty (CBV) in Patients with Rheumatic Mitral Stenosis Using the Modified Philippine Heart Center (PHC) Echocardiographic Scoring System for Rheumatic Mitral Stenosis

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Background: This study aims to assess the applicability of the Philippine Heart Center Echocardiographic Scoring System (PHCESS) in predicting the outcome of catheter balloon valvuloplasty (CBV) in patients with rheumatic

mitral stenosis. Moreover, this paper aims to compare the ability of the PHCESS to predict the outcome of CBV when compared with the Wilkins and the Padial Scoring Systems. **Methods:** This is a prospective cohort study. Patients with rheumatic mitral admitted at the PHC for PTMC from April 2007 to December 2009 were included in the study. Patients who had significant mitral regurgitation (greater than mild) or left atrial and appendage thrombus, significant aortic stenosis and regurgitation or congenital heart disease were excluded from the study. **Results:** A total of 78 patients were analyzed in the study. Twenty-eight had high valve scores using the WESS, forty-six using the PHCESS and twenty-seven using the Padial Scoring System. Eight high Wilkins scorepatients had failed PTMCs, twenty-four high PHCESS patients had unsuccessful PTMCs and ten of the twenty-seven high Padial scores had suboptimal outcome. There was a direct correlation between the Wilkins and PHCESS.The average score that predicted success was ≤8.0 using the PHCESS and seven using the Padial Scoring System. The Wilkins Scoring System did not show cut-off values that predicted outcome. **Conclusion:** The PHCESS is the single best scoring system for predicting outcome of CBV/PTMC.

8

Low Voltage QRS in ECG as a Predictor of Morbidity and Mortality Among In-Hospital Patients with Heart Failure Secondary to CAD in the Philippine Heart Center

Francoise May A. Sarmiento, MD

Background: The 12 lead ECG is a widely used tool in the clinical practice. It is an invaluable tool in the diagnosis and management of cardiac patients. The 12 lead ECG has also been a determinant for risk assessment of patients with coronary artery disease (CAD) and congestive heart failure (CHF) or left ventricular dysfunction. Several studies have shown that QRS voltage in the 12 lead ECG can suggest the clinical outcomes among patients with CAD and CHF. However, there are conflicting results on whether low or high voltage QRS complexes pose a graver prognosis among these patients. **Methods:** This is a prospective cohort study.Patients included in the study are those admitted at the ER and at the ward from June 2008 to January 2009 presenting with signs and symptoms of congestive heart failure as evidenced by positive chest x-ray findings of pulmonary congestion or pulmonary edema. The cause of heart failure in the study population should be secondary to ischemic coronary artery disease, validated by coronary angiogram or history of previous acute coronary syndrome or positive stress test. **Results:** A total of 90 patients with known CAD were included in this study. These patients were admitted due to signs and symptoms of heart failure (complaints of dyspnea, shortness of breath on exertion, easy fatigability, and signs of such as elevated JVP, presence of crackles on auscultation, etc.). The chest x-ray on admission of these patients showed different degrees of pulmonary congestion to pulmonary/interstitial edema. The age difference between the two groups was significant (p=0.048). Gender and other co-morbidities were not statistically significant between the two groups. The NYHA (New York Heart Association) Classification for Heart Failure was significant between the two groups (p=0.000). The presence of diastolic dysfunction significantly correlates with mortality of the patients in heart failure (p=0.071). The severity of diastolic dysfunction is proportional to the risk of death. Primary outcome of all-cause mortality showed no significant difference between the patients with low QRS and those without low voltage QRS on electrocardiograph. **Conclusion:** Low voltage QRS complex in the surface electrocardiogram is not a significant factor for mortality among patients with known CAD being admitted due to heart failure. Age, NYHA classification and the presence of diastolic dysfunction remain to be strong predictors for all-cause mortality among CAD patients with heart failure.

9

The Utility of Lower Extremity Pulse Oximetry in the Detection of Peripheral Arterial Occlusive Disease Among Asymptomatic Patients at Risk Seen as Out-Patient at the Philippine Heart Center

Michelle J. Sinangote-Remerata, MD; Joel Paz, MD

Background: Lower extremity peripheral arterial disease (PAD) is an important manifestation of systemic atherosclerosis and is associated with

markedly increased rates of cardiovascular ischemic events and death. The ABI has long been established as a useful diagnostic tool in the detection of peripheral arterial disease. However, it is not without limitations, as a number of patients with PAD are undetected. It is less useful for patients with non-compressible vessels and in patients with less severe stenosis. This study aims to determine the utility of lower extremity pulse oximetry in the diagnosis of peripheral arterial disease. The study specifically aims to determine the validity of pulse oximetry alone in combination with the ABI in detection of PAD. **Methods:** This is a cross-sectional study involving patients seen at OPD of the Philippine Heart Center, who were asymptomatic but at risk, and not previously diagnosed with PAD. The ankle brachial pressure indexwas obtained using a handheld doppler device. ABI was considered abnormal if it were ≤0.9. Upper and lower extremity pulse oximetry were done in well rested patients in the supine position with the lower extremities elevated by 12 inches. Pulse oximetry was considered abnormal when the lower extremity oxygen saturation was at least 2% less than the upper extremity oxygen saturation. All patients enrolled underwent arterial duplex studies to verify the presence of PAD. Sensitivity, specificity, positive and negative predictive values for detecting PAD were obtained for lower extremity pulse oximetry with or without the ABI using the arterial duplex scan as a surrogate gold standard in detecting PAD. **Results:** There were 89 patients screened and recruited into the study. The mean age was 59.5 years, with majority of patients being females. The most prevalent risk factors were hypertension and dyslipidemia. Of the 89 patients, 68 lower limbs of the 34 patients underwent arterial duplex scan. In this study, the sensitivity of ADS alone in determining presence of PAOD is 33.3%, with a specificity of 97.6%. PPV and NPV are at 33.3% and 97.6% respectively. Using a positive pulse oximetry as an added criteria on top of a positive ABI in determining presence of PAOD did not increase the validity parameters (sensitivity: 33.3%, specificity: 98.9%, PPV: 33%, NPV: 97.6%. However, when a positive ABI or a positive pulse oximetry result were used as a criteria to determine presence of PAOD, the sensitivity increased to 66.7% without markedly affecting the specificity. (96.4%). PPV is 40% while NPV is 98.7%. **Conclusion:** Addition of pulse oximetry on top of arterial duplex scan increases the sensitivity of detection for PAOD without significantly decreasing the specificity of the screening procedure. Therefore, a positive result of the pulse oximetry is highly indicative of PAOD even when the ABI is normal or when the ABI cannot be used to detect PAOD.

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Natriuretic Peptide as Predictor of Morbidity and Mortality Among Patients with Chronic Aortic Regurgitation: Philippine Heart Center Setting

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Background: The need for reliable method to stratify symptomatic patients, especially in heart failure with aortic regurgitation is being explored as a screening tool mostly in an emergency setting. Biomarkers such as the Brain Natriuretic Peptide (BNP), a 32 amino acid peptide released from the ventricular myocardium in response to ventricular pressure and volume load could potentially fill this role. Their levels are elevated in a variety of cardiovascular disorders such as myocardial infarction, congestive heart failure, and pulmonary hypertension and certain valvular disorders. **Methods:** This is a cohort study. Patients from the Philippine Heart Center were included in the study, aged from 19 years old and above with aortic regurgitation 3+ - 4+ functional class I-II by NYHA, with LV dysfunction (EF <55%) presenting with or without heart failure symptoms, predominantly AR with concomitant valvular heart disease. **Results:** Based on the preliminary data gathered, the subjects presented were adults >19 years old, presented with and without symptoms of acute decompensated heart failure. The population consist of the young and middle aged. Majority of the subjects (52%) presented with decompensated heart failure, 15% of which presented with orthopnea and 8% have PND. One subject presented with chest discomfort. The subjects have a history of cardiomyopathy based on 2DED and hypertensive cardiovascular disease (12%). Others have coronary artery disease (16%). Concomitant diseases found in the subjects have both aortic and mitral valve diseases, which are 88% and 8% respectively. 20% had history of MI, with 68% of the subjects presented with history of congestive heart

failure. Medications prescribed on these patients were mainly diuretics, particularly hydrochlorothiazide. Those with concomitant double valve disorders were treated with digoxin (77%). ACE inhibitors were added. On BNP determination, 5 of the subjects showed more than >1100pg/ml, with a maximum recorded value of 10792pg/ml, of which that subject died. These values were taken while the subjects were seen at the ER with symptoms and physical manifestations of congestion. The minimum recorded BNP value was 110.8pg/ml with a mean value of 1494.9pg/ml. The mean value of BNP to the subjects presented with acute heart failure is 2290.89pg/ml, while those subjects presented without heart failure is 632.7pg/ml. No readmissions were observed among the subjects and were asymptomatic upon follow-up, Medications were adjusted accordingly. There was no significant correlation on the mortality between those who have congestive heart failure and those who have heart failure symptoms like PND, orthopnea, chest pain using the Fisher's Exact Test. The lever of mortality among the subjects was 3.8% as occurred to the level above 10000pg/ml. **Conclusion:** Based on the data gathered and statistical analysis, the study demonstrated and determined the levels of the plasma Natriuretic Peptide in patients with aortic regurgitation. Likewise, it also showed the relationship of the levels of the plasma Natriuretic Peptide to mortality as interpreted in the results. However, plasma Natriuretic Peptide did not show any relationship with morbidity among patients with chronic aortic regurgitation, primarily due to lack of time frame and follow-ups among the subject.

11

The Association of High Mean Percentage of Right Ventricular Pacing with the Development of Persistent Atrial Fibrillation in Patients with Sinus Node Dysfunction

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Background: Evidence from post hoc analyses of the Mode Selection Trial (MOST) and prospective trials comparing various pacing protocols have lead experts to believe that a high percentage of ventricular pacing increases the incidence of persistent atrial fibrillation (AF) sinus node dysfunction patients. Contradictory data exists, however, and a specific mechanism for the development of AF due to ventricular pacing has yet to be defined. This study is intented to determine if there is an association between high mean percentage of ventricular pacing (Mean%VP≥50%) and the development of persistent atrial fibrillation (AF) in patient with sinus node dysfunction. **Methods:** This was a retrospective cohort study involving patients who underwent pacemaker implantation for sinus node dysfunction. Pacemaker clinic records were reviewed and mean percentage of ventricular pacing (Mean%VP) was determined using pacemaker rhythm diagnostics data. Patients were deemed to be in persistent atrial fibrillation if atrial fibrillation was detected in two consecutive clinic visits at least three months apart. A chi-square test was used to determineif there was an association between high Mean%VP and persistent atrial fibrillation. **Results:** Out of the 50 patients included in the study, 11 (22%) developed persistent atrial fibrillation. There was no statistically significant association between high Mean%VP and the development of atrial fibrillation [Chi-square = 0.911, df = 1, p=0.34]. **Conclusion:** The study did not find any statistically significant association between high Mean%VP (defined as Mean%VP≥50%) and the development of persistent AF. The study is limited by the low sample size.

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The Adequacy and Effectivity of the Anticoagulant Effect of Enoxaparin versus Unfractionated heparin on Activated clotting time among patients undergoing Elective Coronary Angiography at the Philippine Heart Center

Jerome A. Blaya, MD; James Ho, MD

Background: The use of unfractionated versus low-molecular weight heparin (LMWH) during coronary angiography has been a common practice among interventional cardiologist. This has been limited by the presumed inability to monitor its anticoagulant effect using bedside assays. This study was designed to compare the onset and adequacy of the anticoagulant

effect of pre-procedural UFH versus LMWH among patients undergoing elective coronary angiography (CA) using activated clotting time as the monitoring parameter. **Methods:** A total of 42 patients underwent elective coronary angiography were assigned to intravenous enoxaparin 0.2cc or UFH 2,000 units. Of the 42 patients, 21 were assigned to UFH and the remaining 21 patients were assigned to enoxaparin. We measured ACT at baseline, prior to start of procedure, and at different time points and the results were compared between UFH and LMWH. Incidence of thrombosis formation and hematoma formation were also recorded and compared. **Results:** Both enoxaparin and UFH induced a rise in the ACT level, with an ACT elevation rapidly obtained and maintained using UFH. The time course of changes in the ACT after administration of enoxaparin and UFH was more favorable to the UFH, but the return to baseline was not known to both drugs used. There were no major hemorrhagic complications noted during the procedure. **Conclusion:** The ACT as a monitoring tool for anticoagulation showed the use of UFH to be more superior than enoxaparin. Our data support that IV unfractionated heparin is better in terms of causing immediate anticoagulation and maintaining its effects for the whole duration of the procedure. The increase was significant and was detected rapidly.

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Continuous Versus Intermittent Thermodilution Measurement of Cardiac Output During Coronary Artery Bypass Operation: randomized controlled trial

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Background: This study aims to determine the effects of intermittent bolus thermodilution hemodynamic monitoring with a continuous thermodilution hemodynamic monitoring on clinical outcomes after coronary artery bypass surgery. **Methods:** There are 40 patients recruited for this study. They were randomized into two groups. Group I will be monitored with continuous cardiac output and Group II will be monitored with intermittent bolus cardiac output. Baseline characteristics of patients showed homogeneity in all variables. **Results:** The results of the study showed that the first 15 minutes and 30 minutes for both groups did not show significant differences. By the time it reaches 1 hour there appears to have variability in the reading of the intermittent bolus cardiac output monitoring making its cardiac output reading significantly different from the continuous cardiac reading. In spite of the variability of the readings in the intermittent bolus cardiac output, there was no significant difference in the outcome although it showed a trend towards greater number of morbidity among patients in group II. **Conclusion:** There is a greater variability in the readings of cardiac output using the intermittent bolus thermodilution technique which may affect the management of critically ill patients. This variability is brought about by human errors. But this study fails fails to show any difference in the outcome either by using continuous cardiac output or intermittent bolus thermodilution technique.

14

Comparison of Clinical Outcomes of Early Invasive Versus Conservative Strategies in Patients with High Risk Non-ST Elevation Acute Coronary Syndrome: the Philippine Heart Center Experience

Michelle V. Ferrer-Serrano, MD; Santos-Jose G. Abad, MD

Background: Recent guidelines of ACC-AHA and European Society of Cardiology (ESC) recommend an early invasive approach in high risk patients with non-ST elevation MI and unstable angina. However, despite this recommendation, several randomized trials have not clearly shown that an early invasive strategy among high risk non-ST elevation ACS reduces overall mortality in this setting. **Methods:** All patients diagnosed with non-ST elevation ACS and presented with high risk features were included in the study. Assignment of patients to undergo either an early invasive or conservative strategy were based upon the discretion of the attending physician, taking into account the patient's risks. All patients were followed up during their hospital stay and up to 30 days from the index event. The primary endpoints were cardiovascular related death, non-fatal myocardial infarction, rehospitalization for recurrent angina and revascularization. **Results:**

The cumulative rate of the primary endpoint was 20% with the use of early invasive strategy and 40% with the use of conservative strategy. Cardiovascular death occurred in 20% of patients who underwent invasive strategy and in 11% of patients who underwent conservative strategy. Values were statistically insignificant. However, the rate of hospitalization for ACS were significantly higher in the conservative group compared to the early invasive group (22% vs. 0%, P value = 0.010). **Conclusion:** The data showed than an invasive strategy resulted in a significant reduction of rehospitalisation for ACS in the first 30 days from the time of hospital discharge. This results indicate that an invasive strategy is feasible in patients with non-ST elevation ACS presenting with high risk features.

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Left Atrial Volume and Left Atrial Function Indices as Predictors for the Occurrence of Post-Operative Atrial Fibrillation Among Patients Undergoing Cardiac Surgery

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Background: Postoperative atrial fibrillation commonly occurs after cardiac surgery. Occurrence of atrial fibrillation (AF) is observed in 10-50% of patients undergoing cardiac surgery. The incidence of post-operative atrial fibrillation (POAF) varies depending on patient characteristics and type of operation. It is associated not only with increased morbidity but also with prolong8 The etiology of POAF remains incompletely understood. Several risk factors had been identified, mainly intra-operative and post-operative variables, both of which are not clinically useful in stratifying patients at risk before surgery. Among the pre-operative variables, only age and atrial dimensions, particularly left atrial volume were considered significant predictors of POAF. Echocardiography by 2d echo and by real-time 3D echo (RT3D) is useful in the non-invasive evaluation of left atrial (LA) functions. To date, there are no prospective study published that compared LA volume index to LA function for the prediction of post-operative AF. This study was done to identify echocardiocargraphic pre-operative predictors of post operative atrial fibrillation among patients undergoing cardiac surgery. **Methods:** Adult patients undergoing CABG surgery, and surgery involving the aortic valve, ascending aorta, tricuspid valve, pericardium and cardiac masses with pre-operative 2DED and RT3D done at PHC from May to November 2009, were included in the study. The following LA parameters by 2D echo were studied: LA volume, LA volume index (LAVI), LA ejection fraction (EF), LA area, pulmonary vein peak systolic, peak diastolic and flow reversal velocities were included as well as mitral inflow velocity with peak early (E) and late velocities (A) and VTI E/A ratio. Real time 3D echo parameters included: LA stroke volume, LAVI max and LA ejection fraction. All patients were followed daily for three three (3) days post surgery with electrocardiographic telemetry for the occurrence of POAF. All telemetry data were reviewed by an independent observer, blinded from the pre-operative assessment of LA function. **Results:** Of the 60 patients included in the study, postoperative atrial fibrillation occurred in 11 (18%) patients. Clinical characteristics were similar among those who did and did not develop POAF. CABG surgery is associated with absence of atrial fibrillation. (86% versus 54%, p=0.033). Trends in the following parameters in predicting post-operative AF were noted in 2d echo such as LAVI, LA EF and LA area and in real time 3D echo these parameters included LA stoke volume and LAVI. However, these did not reach statistical significance. **Conclusion:** The incidence of post-operative atrial fibrillation observed in this study is 18%. Among the echocardiographic parameters studied, there is a trend for those with higher LAVI, larger LA area and lower LA EF to develop post-operative AF.

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Prognostic Value of Pulsed Wave Tissue Doppler Velocities of the Tricuspid Annulus and other Echocardiographic Variables to Assess Right Ventricular Function Among Patients With Rheumatic Mitral Valve Disease Post-Intervention

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Background: Right ventricular function has a

significant impact, independent of Left Ventricular function, in the course of congenital as well as acquired heart diseases such as rheumatic heart disease, or right ventricular (RV) infarction. Pulsed wave DTI velocities of the TV annulus will allow for rapid, accurate and reproducible parameters for assessment of RV function. This study was done to determine the prognostic significance of pulsed wave tissue doppler velocities of the TV annulus and various other echocardiographic variables for RV function among patients with Rheumatic Mitral Stenosis and/or regurgitation undergoing intervention (PTMC or MV repair or replacement). **Methods:** This is a prospective cohort study. A total of 37 adult patients at the Philippine Heart Center diagnosed with Rheumatic Mitral Valve Disease were included (August – December 2009) and underwent intervention (PTMC, mitral valve repair or replacement). Baseline characteristics such as age, sex, rhythm, heart rate, serum creatinine and albumin levels, predominant lesions (MS, MR or combined), severity of tricuspid regurgitation and pulmonary artery pressures were recorded. Pulsed DTI velocities of the lateral TV annulus were recorded as peak systolic S, early and late (E and A) velocities, ejection time (ET), Deceleration time (DT), as well as TAPSE, using direct and M-mode methods, and FAC for RV function were taken. Patients were followed up as to outcomes of death and/or right-sided heart failure. **Results:** Twenty eight (75%) of the subjects were female and only ten (25%) were male. The mean age was 39.5 years ± 12.74. Twenty (54%) of the patients were in sinus rhythm, while the rest (n=17, 46%) were in atrial fibrillation. Other baseline characteristics were likewise taken such as SBP (mean 106 ± 10 mmHg) and heart rate (78 ± 8 bpm). Pulsed DTI velocities showed peak tricuspid systolic annular velocities (S) with a mean of 0.13 ± 0.1178 m/sec, E and A velocities mean of 0.12 ± 0.122 and 0.09 ± .02m/sec, respectively. The IVCT and IVRT were 87.70 ± 19.8 msec and 94.5 ± 27.765 msec, respectively. The Ejection time (ET) and Deceleration time (DT) were 257.76 ± 34.875 msec and 104.57 ± 24.730 msec, respectively. TAPSE in M-mode and direct method, mean of 1.5903 ± .0.23 cm and 1.55 and 1.55 ± 0.22cm, respectively with no significant difference between the two methods. FAC (%) of the RV had a mean of 43.89 ± 7.92%. **Conclusion:** Determination of the pulsed DT velocities of the lateral TV annulus is feasible and provides information on the systolic and diastolic function of the right ventricle. Among the baseline characteristics studied, those with a good outcome after mitral valve intervention had lower pre-operative heart rate of 76 ± 1.79 bpm, compared to the group with outcomes of death and/or right-sided heart failure, HR= 91.5 ± 9.25 bpm with a significant p value of 0.001. Among the echocardiographic indices for RV function, those with FAC (%) of 44.82 ± 7.67 had better outcomes compared to the second group, lower FAC (%) 36.25 ± 6.13, with a significant p value of 0.50. There was a trend towards lower IVRT (<100msec) and ET (<250msec) for the first group, but the difference were not statistically significant, p value of 0.19 and 0.11 respectively.

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High Sensitivity C-Reactive Protein Level as Predictor of Outcome in Chronic Stable Angina Patients Undergoing Percutaneous Coronary Intervention

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Background: High sensitivity C-Reactive Protein (hsCRP) elevation is associated with peri-and-post-procedural complications during Percutaneous Coronary Intervention in the setting of acute coronary syndromes, but the prevalence and prognostic significance of preprocedural hsCRP elevation among patients with chronic stable angina undergoing PCI is unknown. **Methods:** Between December 01, 2009 to January 31, 2010, eighty eight patients who underwent stent placement were included in the study. We analysed the frequency of hsCRP elevation before PCI and its relationship to major adverse cardiac events among patient who underwent PCI for chronic stable angina. **Results:** Among the stable coronary artery disease population (N=88), 30 patients (34.1%) had a less than 1.0mg/L hsCRP, 28 patients (31.8%) had hsCRP between 1.0 to 3.0mg/L and 30 patients (34.1%) had more than 3.0 mg/L hsCRP level. Comparing the 3 groups using multivariable analysis considering the adjusted demographic, clinical, angiographic and procedural factors, baseline hsCRP elevation of more than 3.0mg/L had a higher MACE (13.3%) compared with those patients with hsCRP level of 1.0 to 3.0mg/L (7.1%) and less than 1.0mg/L (0.0%). **Conclusion:** Based on our

findings, there was a trend of association with elevated pre-procedural hsCRP level and major adverse cardiac events in CSA patients who will undergo PCI in 30 days follow-up. However, further large-scale studies are required to validate our claim that CSA patients with high baseline visit hsCRP levels and modify the follow-up strategies.

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Association of Pulse Pressure with CCA-IMT Among Filipino Hypertensive Patients Seen at Philippine Heart Center

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Background: Common carotid artery intima media thickness has been adopted as a surrogate marker for subclinical atherosclerosis. The measurement of the carotid intima media thickness (IMT) of the common carotid artery has been validated as a marker for the presence of early atherosclerosis and degree of arteriosclerosis of individuals.[1-6] Hypertension is a major risk factor for carotid intima media thickening. Pulse Pressure (PP), is a significant independent marker of cardiovascular mortality [9,10] and was found to modify the Intima Media Thickness. [15-17] Increased Common Carotid Artery Intima–Media Thickness (CCA-IMT) and carotid and/or iliofemoral (C/IF) plaque are commonly seen in subjects with hypertension, but their correlation with pulse pressure (PP) has rarely been studied.[18] The objective of this study is to determine the correlation between the Pulse Pressure and CCA-IMT among Hypertensive Filipino patients seen at Philippine Heart Center. **Methods:** This is a prospective, cross sectional study. Patients with a BP of ≥ 140/90 mmHg or those who were previously diagnosed with hypertension and on anti-hypertensive medications were included in the study. Patients with Aortic Regurgitation and those who underwent carotid stenting were excluded from the study. Brachial Blood Pressure was measured, an the common carotid artery intima mediamedia thickness was measured using B mode ultrasonography. Ultrasound examination was performed with the use of an 8-MHz annular array Phillip's ultrasound imaging system by a single trained Cardiology fellow. Subjects were examined in the supine position. **Results:** There was a total of 97 Hypertensive subjects enrolled in the study and was subdivided into Four Groups according to Blood Pressure (Controlled/ Uncontrolled) and Pulse Pressure (High/ Low). The Uncontrolled BP-High PP Group (Group 3) has a more older population, more diabetics and more patient with prior history of Stroke, although this group has the most number of patients that are well maintained on Anti-hypertensive medications, Oral Hypoglycemic agents, and Anti-Platelets than the Low PP Group. Apparently, the Mean CCA-IMT did not differ significantly with Group 4 (Uncontrolled BP-Low PP Group), even with adjustment of P-Value with confounders. It only shows that Mean CCA-IMT significantly differ between groups with Controlled BP (Group 1 and 2) but not with Uncontrolled BP (Group 3 and 4).The Mean CCA-IMT was significantly higher among Groups with High Pulse Pressure (PP) Regardless of BP status whether Controlled or Uncontrolled. **Conclusion:** The Average CCA among hypertensive Filipino patients seen at Philippine Heart Center was 0.678mm ± .512, which is almost similar with the CCA-IMT values among Chinese (Asian) population, with an age range of 65-84 y/o in male and 75-84 y/o in female, which both fall within the 25th percentile of normal range. Apparently, there is no local data on the average CCA-IMT among healthy Filipino population. The Average Pulse Pressure is 54mmHg ± 14mmHg. The Average SBP is 134 ± 17mmHg and Average DBP of 81 + the ± 14mmHg. CCA-IMT is directly correlated with Pulse Pressure, as well as with Age, which is also seen in the Vascular Aging Study (EVA Study) and in a study done by Tartiere et al who reported that CCA-IMT was correlated with Age and Pulse Pressure, and that even patients with controlled BP may still have increased CCA-IMT values.

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The Role of Dobutamine Stress Echocardiography in Predicting Future CV Events Among Diabetic Patients After Myocardial Infarction: a PHC Experience (preliminary report)

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Background: Several studies have already shown the association of diabetes with a higher rate of coronary lesion progression suggestive of a characteristic vascular involvement seen among patients afflicted with this condition as opposed to those without it. In our local setting, only few studies provide adequate data with regards to the use of dobutamine stress echocardiography (DSE) in predicting future cardiovascular events after AMI. The aim of this study is to compare the prognostic value of DSE in predicting cardiovascular events among diabetic and non-diabetic patients after an episode of myocardial infarction. **Methods:** All diabetic and non-diabetic ACS patients admitted at the Emergency Room Chest Pain Unit (ER-CPU) of Philippine Heart Center and managed medically without undergoing revascularization were reassessed for cardiac risk and extent of residual myocardial ischemia and/or injury by subjecting them to DSE 14 ± 8 days after an episode of MI (STEMI/NSTEMI) from October 2009 to March 2010. Follow-up data was obtained from hospital records, personal or telephone interviews of the patients at least 1 month and where applicable, for another 6 months after DSE for the occurrence of hard cardiac event (cardiac death or a non-fatal MI) or soft cardiac events (new-onset of worsening angina, CHF). A total of 38 subjects were included in the study; of which 29 were non-diabetics and 9 were diabetics. **Results:** No significant statistical difference were noted between the two groups at baseline. Majority of the diabetic patients post-MI were older (56.33 ± 8.1), predominantly male (56%), hypertensive (67%) and dyslipidemic (67%). The non-diabetics in turn, were commonly younger (47.5 ± 5.26), dyslipidemic (21%), hypertensive (48%) and with smoking history (21%). Based on DSE, both groups commonly presented with 3-vessel involvement. The wall motion score index (WMSI) at peak stress, although not significant, was found to be slightly higher for diabetic patients (1.83 and 1.68 for the diabetics and non-diabetics respectively). Dobutamine time was also found to be shorter among diabetic as compared to the non-diabetic patients. All patients were monitored for the presence of MACE for a period of 1 to 6 months with a mean follow-up of 106 days. Unstable angina was the only event noted during this time. Among the 8 (21%) patients who developed unstable angina post-MI (44%) were diabetics and 4 (13.8%) were non-diabetics. Majority of the diabetics were also older, hypertensive and dyslipidemic but with equal gender incidence. DSE results were positive in 4 diabetic patients of which, 3 developed unstable angina. Although not statistically significant (Kappa = 0.046 ± 0.164 and p value = 0.611), DSE showed sensitivity of 75% and a specificity of 80% for the presence of unstable angina. Among the non-diabetic patients however, only 1 out of 9 positive DSE results developed unstable angina. This shows a sensitivity of 25% and a specificity of 68% for the presence of unstable angina which is also not statistically significant (Kappa = 0.550 ± 0.333 and p value = 0.198). **Conclusion:** This study shows that there is a trend for a good correlation of a positive DSE with the development of unstable angina among diabetic patients after AMI owing to a good sensitivity (75%) and an even better specificity (80%) of a positive DSE even though statistically insignificant. The presence of a higher WMSI, shorter dobutamine time, lower but modest LVEF, and propensity for multi-vessel involvement in diabetics showed a tendency for better association with the incidence of unstable angina. As of yet however, it is to early to make valid conclusion considering that the available population is only 40% of the computed sample size.

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Left Atrial Appendage Function as a Predictor for the Presence of LAA Thrombus in Patients with Rheumatic Mitral Stenosis in Sinus Rhythm

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Background: Cerebro-embolic accident may be the initial presentation of thromboembolism in MS and anti-coagulation is warranted especially in atrial fibrillation. However, in MS patients in sinus rhythm, initiation of such treatment remains a dilemma. The purpose of this study is to determine LAA function as a predictor for the presence of LAA thrombus in patients with MS in sinus rhythm. **Methods:** A prospective, cross-sectional study included fifty six (56) patients with severe MS in sinus rhythm referred for TEE. Baseline characteristics and the LAA function was evaluated by measuring the appendage dimensions, ejection fraction and velocities at the orifice and its walls and these parameters were correlated with the presence of a thrombus and SEC. **Results:** The mean age was 35.7 ± 8.9 years, predominantly females (78.6% vs. 21.4% males), mean HR 76.6/min and INR of 1.28. The mean LA size is 4.8cms ± 0.69, volume index 54.4 cc/m^2 ± 24 and LA ejection fraction is 27.5% ± 6.56. Of the 56 patients, eight (8) has LAA thrombus (14%) and thirty three (33) has SEC (59%). When compared to MS patients with no thrombus, patients with decreased left atrial wall contraction velocity (5.941 ± 2.46 vs. 9.325 ± 3.6 p=0.007), LAA ejection fraction (18.9% ± 7.5 vs. 28.44% ± 9.6 p=0.010), larger LAA orifice 6.69cm ± 2.2 vs. 3.46cm ± 1.2 p=0.000) and width (6.18cm ± 2.16 vs. 3.22cm ± 1.42 p=0.000) and decreased emptying velocities at the LAA orifice (7.9 cm/sec ± 2.36 vs. 25.66 cm/sec ± 12 p=0.000) and LAA wall (10.4 cm/sec ± 4.27 vs. 25.6cm/sec ± 11.76 p=0.000) and filling velocities at the LAA orifice (12.5cm/sec ± 3.2 vs. 32.08 ± 15.46 p=0.002) and wall (12.75cm/sec ± 4.68 vs. 29.2 ± 10.73 p=0.000) were associated with the presence of LAA thrombus. On the other hand, the presence of SEC was associated with with decreased LAWC (7.76cm ± 2.56 vs. 10.6cm ± 3.9 p=0.002), larger LAA orifice (4.63cm ± 1.95 vs. 2.9cm ± 0.63 p=0.000) and width (4.1cm ± 2.06 vs. 3.01 ± 1.27 p=0.019) and decreased emptying velocities at the LAA orifice (17.86cm/sec ± 11.6 vs. 30.96 ± 10.4 p=0.000) and LAA wall (18.36cm/sec ± 9.35 vs. 30.7cm/sec ± 12.3 p=0.000) and filling velocities at the LAA orifice (23.9cm/sec ± 15.83 vs. 37cm/sec ± 12.77 p=0.002) and LAA wall (21.84cm/sec ± 9.5 vs. 33.96cm/sec ± 10.73 p=0.000) were associated with the presence of SEC. **Conclusion:** An assessment of the LAA function is important in patients with rheumatic MS in sinus rhythm and serves as guide in anticoagulation. In this study, MS patients with depressed LAA, EF, large LAA orifice and width and decreased emptying filling velocities are associated with thrombus formation and anticoagulation should be considered.

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Correlation of Metabolic Syndrome to Brachial Flow-mediated Dilatation in Filipino Hypertensive Patients seen at the Philippine Heart Center

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Background: Literature widely confirms the association of the brachial flow-mediated dilatation with the classic cardiovascular risk factors: arterial hypertension, hypercholesterolemia, smoking, diabetes, and ischemic stroke. The metabolic syndrome is a cluster of cardiovascular risk factors that will ultimately lead to endothelial dysfunction and subsequently to atherosclerosis, increasing the risk of cardiovascular disease and diabetes. The authors will attempt the relationship of metabolic syndrome with the brachial flow-mediated dilatation in Filipino hypertensive patients seen at the Philippine Heart Center. **Methods:** We conducted a prospective, cross-sectional study involving adults 20 years of age and above with hypertension and seen at the PHC (employees, patients undergoing executive checkup, and patients in the HPN/Preventive

Clinic. We determined blood pressure, fasting blood sugar and lipid profile. We applied the National Cholesterol Education Program Adult Treatment Panel criteria to determine the presence of metabolic syndrome. We also determined flow mediated dilatation of the brachial artery. **Results:** There were 76 study participants, with women predominating in both the metabolic syndrome arm (71%) and control arm (61%), respectively. All the studied participants were known to have hypertension. There was no significant difference in terms of age among the two groups. The prevalence of metabolic syndrome was noted at 59 with females predominating in the gender category, comprising 71% of the total There was a statistical significant difference in the two groups when the following parameters are noted: weight, Kg (*p – 0.005*), BMI, Kg/m^2 (*p- 0.001*), waist, cm (*p – 0.000*), SBP, mmHg (*p – 0.009*), HDL, mg/dl (*p – 0.000*), Triglycerides, mg/dl (*p – 0.000*), FBS, mg/dl (*p – 0.001*). Baseline FMD, post-hyperemic FMD, and FMD% change was not statistically significant between the metabolic syndrome group versus the control group. Correlating the % FMD change with the specific components of MS - waist, SBP/DBP, HDL, triglycerides, and FBS showed a weak inverse correlation (except for the FBS which showed an inverse correlation at the 0.05 level). **Conclusion:** The metabolic syndrome is highly prevalent in Filipino hypertensive patients as expected because of the presence of one metabolic syndrome component. An inverse correlation was found between the % FMD change and baseline FMD but an insignificant inverse correlation was noted between % FMD change and the NCEP components for the metabolic syndrome: waist, SBP, triglyceride, and HDL levels. There was an inverse correlation between % FMD change and FBS, but at the 0.05 level. Although brachial FMD responses are not related to MS, the status of systemic endothelial function seems to modify the relations between metabolic risk and atherosclerosis. Individuals with evidence of enhanced endothelial function may be protected against the development of subclinical atherosclerosis in response to metabolic risk factors.

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Phase II of Cardiac Rehabilitation Program: Effects on the Physical and Metabolic Status of Post-Bypass Patients

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Background: Cardiac rehabilitation is a medically supervised program to help heart cardiac patients recover quickly and improve their overall physical, mental and social functioning. Studies showed that it is effective for improving risk factors for coronary artery disease and increases the tolerance of patients to exercise, especially those patients with coronary artery disease after cardiac events. The objectives of this study is to compare the physical and metabolic effects of cardiac rehabilitation with the self-administered exercises amongst post-bypass patients. **Methods:** This is a prospective cohort study which included male or female patients who had undergone bypass surgery at the Philippine Heart Center from May 2009 to October 2009. A total of 20 subjects (12 subjects for the Intervention Group and 8 subjects for the Control Group) were recruited. Baseline data for the Intervention and Contol Group were collected These included anthropomoteric measurements (height, weight, waist circumference, hi circumference, BMI) and the metabolic profiles (FBS, Lipid Profile). The Intervention Group underwent Phase II of Cardiac Rehabilitation Program. The Control Group had their self-administered exercises. Two months after surgery, data were collected again for comparison. **Results:** Majority of patients were male for both the Intervention and Control Group. Most of them were non-diabetic. During the study period, the standard medications were given to patients. Data from the Intervention Group showed that the FBS, total cholesterol, Triglycerides decreased significantly while the HDL increased significantly with the P value of <0.05. Only the weight and BMI in the Control Group showed a significant difference with the P value of <0.05. **Conclusion:** Results showed that participation in the exercise training program showed an improvement in the metabolic parameters such as FBS, total cholesterol, triglycerides HDL and LDL. Due to the small population obtained, we cannot therefore conclude whether no exercise training program does not have any difference

with those who had undergone cardiac rehabilitation.

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Outcome of Pediatric Patients with Ventricular Septal Defect (VSD) Associated with Aortic Regurgitation (AR) Who Underwent Surgical Closure of VSD at the Philippine Heart Center in 2007-2008

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Background: Ventricular septal defect (VSD) is the most common cardiac malformation, if bicuspid aortic valve is excluded. Aortic regurgitation develops in about 5% of all ventricular septal defects. Patients can develop aortic valve regurgitation due to the prolapse of the adjacent aortic valve leaflet caused by Venturi forces associated with the left-to-right flow across the defect. The risk of aortic valve prolapse increases with increasing defect size. This study was done to determine the outcome of the aortic regurgitation in pediatric patients with VSD associated with AR who underwent surgical closure of VSD. **Methods:** We reviewed the records and echocardiogram of 35 pediatric patients who underwent surgical closure of VSD at the Philippine Heart Center during the period January 2007 to September 2008. **Results:** Fifty one (51) percent of the patients are males and 49% are females. Majority of the patients in both sexes belong to the 11 to 14 years age group. There is an almost equal frequency of patients with VSD, AR with the perimembranous and subpulmonic type of VSD. After surgical correction, 11.4% of the subjects had decreased regurgitant fraction; 65.7% had decreased LVEDV; 28.5% had decreased LVESV; that 11.4% had increased FS; 68.5% had decreased LVESD; 80% had decreased LVEDD; and 51.4% had increased EF. The results imply that there was improvement in the LV measurements and function as well as improvement in the AR as shown by decreased RF in the table. The decrease in the left ventricular end systolic and diastolic volumes was in accordance with the decrease in the LV end systolic and end-diastolic diameters. **Conclusion:** It can then be concluded from the study that RF, LVEDD, LVESD, LVEDV, and LVESV had improved after surgical closure of the VSD. On the other hand, the two other variables, i.e., FS and EF had no sufficient evidence to support that these parameters improve after the intervention.

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The Utility of Real Time Three Dimensional Echocardiography in the Diagnosis of VSD with Surgery as the Gold Standard

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Background: Accurate assessment of the sizes, shape and location of the Ventricular Septal Defect (VSD) is important in the surgical planning and more so in the transcatheter procedure for its closure. Three dimensional echocardiography provides a non-invasive visualization and reconstruction of the VSD. This study was done to determine the value of RT3D (Three Dimensional Echocardiography) in the accurate diagnosis of the anatomic characteristic of Ventricular Septal Defect and to correlate with surgical findings. **Methods:** 27 patients diagnosed with VSD as a single lesion or as part of more complex cardiac lesion who underwent total correction were examined using RT3D. Three dimensional images were post processed using the 3D work station. The results were compared with 2DED (Two Dimensional Echocardiography), IOTEE (Intraoperative Echocardiography) and surgical findings. **Results:** Analysis of the VSD location were the same in RT3D, IOTEE and intraoperatively. Two patients who had doubly committed VSD were classified under perimembranous VSD during 2DED. IOTEE is most accurate in the diagnosis of VSD size, followed by RT3D, and 2DED is least accurate. **Conclusion:** IOTEE is the most accurate in the diagnosis of VSD size and location however, RT3D has no statistical significant difference as compared to IOTEE and surgery.

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Assessment of Aortic Valve Diseases Among Pediatric Patients Using Three Modalities-2 Dimensional, 3 Dimensional and Trans-esophageal Echocardiography

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Background: Aortic valve disease has become a great concern and a reason for urgency of surgery in pediatric population. Echocardiography, as a non-invasive modality, has become the procedure of choice for the evaluation of valvular diseases, This study was done to compare the value of 2D-Echo (2DE), 3D-Echo (3DE) and trans-esophageal echocardiography (TEE) in the assessment of aortic valve disease among children and to correlate it with surgical findings. Specific objectives are to describe the aortic valve morphology and pathology, with the surgical findings as the gold standard, and to compare the degree of regurgitation /stenosis using the three modalities. **Methods:** This is a prospective cross-sectional study involving 17 patients less than 19 years old diagnosed with aortic valve disease, both congenital and acquired, from June 2009-May 2010 who had undergone surgery. All subjects underwent 2DE, 3DE and TEE evaluation of the aortic valve. The findings were then compared with intraoperative findings. **Results:** 2D, 3D and TEE had significant correlation with the surgical findings, with the 3D giving the highest agreement in the determination of aortic valve pathology. Likewise, 3D-E also showed superiority in the determination of aortic valve morphology, followed by TEE, Endocarditic lesions such as perforated aortic cusps were among the lesions not properly identified by 2D-E 2D-E and 3D-E have the highest correlation in the determination of the degree of stenosis/regurgitation. **Conclusion:** Two-dimensional echocardiography allows optimal morphological and pathological assessment of the aortic valve. In combination with 3-dimensional echocardiography, non-invasive echocardiography will provide us with the complex abnormalities particularly, evidences of valvular endocarditis. TEE also failed to identify evidences of valvular endocarditis and RCSOV. A longer study period and larger sample size is recommended to obtain conclusive results in the study of the pathology and morphology of the aortic valve. Moreover, additional training on the part of the echocardiographer would greatly contribute in the better assessment of the aortic valve.

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Scoring System for Predicting Mortality in Cyanotic Patients with Hypoxic Spells Admitted at the Philippine Heart Center

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Background: Hypoxic spells although most frequently seen in patients with TOF may also occur in infants or children with other congenital heart disease especially if with severe pulmonary stenosis. Hypoxic spells is characterized by a period of uncontrollable crying, raid and deep breathing (hyperpnea), deepening of cyanosis, convulsions and occasionally death. The objective of this study was to develop a scoring system for predicting mortality in cyanotic patients with hypoxic spell brought to the Emergency Room. **Methods:** A prospective case control study was done on all patients brought to PHC-ER because of hypoxic spell from July 1, 2009 to December 31, 2010. Records of cyanotic pediatric patients brought to the Emergency Room of the Philippine Heart Center were identified from the Emergency Room Admission Logbook. **Results:** A total of 109 patients were included in the study. Among the variables noted were demographic profiles, presence or absence of murmur and vital signs wherein hyperpnea was significantly correlated with patients who died. On the other hand, laboratory parameters noted to be associated with mortality in hypoxic spells were ABG-pH, bicarbonate, CBC showing leukopenia, haemoglobin, haematocrit, prolonged PT, APTT, McGoons Index less than 1.4cm. The different variables were statistically treating using a Chi-square test and independent t-test. Cut off values were assigned to each of the 10 variables where a scoring system was derived, 0 for those who survived and 1 for those who died. A score of ≥ 5 out of the total score of 10 was predictive of mortality and a score of ≤ 5 was predictive of survival. **Conclusion:** This study was able to develop a scoring system for predicting mortality among cyanotic patients with hypoxic spell brought to the Philippine Heart Center. The following variables were respiratory rate,

pH, bicarbonate levels, WBC, haemoglobin, haematocrit, prolonged bleeding parameters and McGoons Index were assigned a cut of values where a scoring system was derived. A score of ≥5 out of the total score of 10 was predictive of mortality and a score of ≤5 was predictive of increase chances for survival.

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Association of Pulmonary Arterial Pressure, Oxygen Levels and Cardiac Output among Children with Persistent Pulmonary Arterial Hypertension after Surgery: A 2-year follow-up

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Background: It is believed that surgical correction of the shunt aborts the progression of the pulmonary hypertension secondary to flow (dynamic PAH). However the pulmonary arterioles at that time may have undergone significant thickening after 2 years old and may be irreversible despite surgical correction. The drop in pulmonary arterial pressure (PAP) after surgical correction has been evaluated to be within 6 months to 1 year after surgery. Some patients however come back after 2-5 years after surgery with complaints of easy fatigability suggestive of progression of the pulmonary hypertension. This subset of patients, both in literature and in practice, has never been evaluated. This study is done to determine the changes in pulmonary arterial pressure in children with pulmonary arterial hypertension among children after corrective surgery and its correlation with cardiac output and oxygen levels. **Methods:** This is a cohort study. The following variables were gathered from the patients 18 year old and below before and after surgery at different intervals 1 month, 3 months, 6 months, 9 months, 12 months, 15 months, 18 months, 21 months and 24 months who underwent surgical correction. Variables were as follows: Pulmonary arterial pressure (PAP) based on pulmonary acceleration time (PAT), tricuspid regurgitation jet (TR jet) by 2D echo Doppler method; Pulmonary vascular resistance (PVR) by 2D echo; Cardiac output (CO) by 2D echo Simpson's; Level of pO2 by ABG. **Results:** Pulmonary pressure monitoring by pulmonary acceleration time from baseline and every 3 months after surgery until 24 months showed a normalization of pulmonary arterial pressure at 12 months. Likewise, pulmonary arterial pressure based on TR jet normalized at 12 months after surgery and thereafter. Pulmonary vascular resistance was also noted to reach normal value after 12 months and thereafter. There was an earlier normalization of pO2 level at 1 month after surgery. Cardiac output normalized at 18 months after surgery. The pulmonary pressure changes over time based on PAT, TR jet and PVR were statistically significant with a p-value of <0.05. Likewise the changes in the pO2 levels and cardiac output were statistically significant. **Conclusion:** In this study, pulmonary pressure and pulmonary vascular resistance normalized at 12 months after surgery. Level of oxygenation improved relatively earlier at 1 month after the surgical correction. Among the parameters, the cardiac output however was shown to have a late normalization at 18 months after surgery. Thus vigilant monitoring of patients must be observed even after the time when pulmonary arterial pressure is normal because cardiac output may have not reached its optimum levels yet.

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Predictors of Arrhythmia in Children Undergoing Cardiac Surgery at the Philippine Heart Center: a retrospective study

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Background: Arrhythmia is a frequently encountered problem post-operatively in patients undergoing cardiac surgery in adults and children alike which poses additional resource burden and may contribute to unfavourable post-operative outcomes. Despite this, to date we have few data identifying the risk factors in the occurrence of arrhythmia post-operatively. **Methods:** Charts of patient aged 0 to 19 years old who underwent open heart surgery between January 2008 to June 2008 were included in the study. The following parameters will be measured and noted: age during surgery, weight, sex, preoperative rhythm strips for presence of arrhythmia, type of surgery, cyanotic or acyanotic

heart disease, total bypass time, total cross-clamp time, electrolyte levels post-operatively (Na, ca, K, Mg), blood sugar levels immediately post-op, PRBC transfusions, residual defect post-surgery, redo operations. The data will be presented as frequency and percent distribution, mean and standard deviation. Association of the different factors with occurrence of arrhythmia with T test, chi-square test or Mann Whitney U Test. Two-tailed value of $p \leq 0.05$ will be considered. **Results:** In the study, a total of 74 (44 males, 30 females) patients who underwent open heart surgery for congenital lesions were included. Patients' aged ranged from 0.16 years old to 18 years old. The mean weight was 12.54kg. Of the subjects, 13.5% developed arrhythmia post-operatively the most common of which is premature ventricular contraction and all the arrhythmias occurred during the first 24 hours post-operatively. Of the pre-operative predictors, lower body weight and pre-op arrhythmia were associated with post-op arrhythmia ($p<0.05$) and cross clamp time at p value of 0.002. **Conclusion:** Lower weight, pre-operative arrhythmia and longer cross clamp time are predictors of post-operative arrhythmia. The most common post-operative arrhythmia was premature ventricular contraction.

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Outcomes of Patients with Mitral Valve Disease after Mitral Valve Surgery

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Background: Mitral valve repair and mitral valve replacement have been the mainstays in the management of mitral valve disease. This study was done to determine the outcomes of pediatric patients undergoing mitral valve surgery. **Methods:** We reviewed the records of patients aged 0-19 years old who underwent mitral valve surgery from 2002 to 2004. We obtained the clinical, echocardiographic and outcome characteristics of these subjects. We followed them up for a period of 1 to 6 years and determined the echocardiographic characteristics during these times. **Results:** Forty-five (45) subjects were enrolled, with 24 patients underwent MV repair and 21 patients underwent MV replacement. Majority of the lesions were mitral regurgitation and rheumatic in etiology. There were 3 mortalities reported in this study. There is a significant decrease in LVESD, LVEDD and left atrial size and an increase in mitral valve area noted one year after surgery. **Conclusion:** Majority of the subjects who underwent mitral valve surgery had a rheumatic etiology of their mitral valve lesions. Majority of the lesions are mitral regurgitation. Mitral regurgitation and mitral stenosis improved over time after the mitral surgery.

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Safety and Efficacy of Hypertonic Sodium Lactate compared with 6% Hydroxyethyl Starch in Patients during Cardiac Surgery

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Background: This study aims to show any difference on hemodynamic and fluid balance effect and demonstrate the safety of HSL compared to HES. Patient undergoing cardiac surgery frequently experienced hypovolemia. Intraoperative intravascular volume optimization in such patients could decrease post-op morbidity and reduce length of hospital stay. Maximizing CO through titrated perioperative volume expansion was associated with better improvement. However ideal fluid to be used in the perioperative period is still a point of debate. Patient having cardiac surgery often have reduced myocardial function that may not tolerate large volume of fluid for hemodynamic stabilization. In this situation small volume administration of fluid which has a larger volume expansion effect and removing extracellular fluid excess may be beneficial. **Methods:** Patients ages 45-75 who will undergo cardiac surgery were enrolled to thestudy. They were randomly selected and assigned to one of the two groups who will receive HSL or HES. Demographics and medical history were taken, hemodynamic data,laboratory parameters, arterial blood gas analysis, fluid balance, OR time and length of hospital stay were recorded. Data were described using means, frequency counts and percentages. T-test for independent samples was used to determine difference between means while chi-square

was used to determine association between discrete variables. For all tests, a 95% confidence level was considered significant. **Results:** Demographic data as well as hemodynamic data did not differ between the 2 groups. HSL group had a significantly higher lactate and CBG intraoperatively. Intraoperative urine output was significantly higher in HSL group than HES group. No adverse events were noted in both groups. **Conclusion:** This randomized controlled trial demonstrates the clinical safety and efficacy of HSL compared with HES 6% during cardiac surgery.

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Prosthetic Valve-Patient Mismatch Among Patients Who Underwent Aortic Valve Replacement in the Philippine Heart Center

Rafael Martin D. Hilado, MD; Nelson Lee, MD; Christopher Cheng, MD

Background: Prosthesis-patient mismatch (PPM) can lead to higher mortality rates. The clinical impact seems to be related to both its severity and LV function, emphasizing the fact that a diseased ventricle is much more sensitive to increased afterload. This study aims to determine the incidence of aortic valve prosthesis patient mismatch (PPM) among patients who underwent aortic valve replacement in the Philippine Heart Center From the year 2000-2009 and to determine their clinical outcomes in terms of morbidities, in-hospital mortality and LV mass regression. **Methods:** All patients who underwent isolated aortic valve replacement at the Philippine Heart Center from 2000-2010 were included in the study. A review of the patient's charts, including, operative records, pre-operative and post-operative two-dimensional echocardiograms and/or transthoracic echocardiograms were made. The patients' demographic characteristics, indications for operation, pre-and post-operative functional class were also determined. The change in left ventricular mass, left ventricular mass index and Indexed Effective Orifice Area (iEOM), presence of aortic prosthetic valve-patient mismatch and the severity of the mismatch (mild, moderate or severe) were then determined for each patient and adverse events such as, morbidities, re-operation rates and in-hospital mortality were noted. **Results:** 383 patients with age range between 17 to 85 years old and a mean age of 47.3 ± 16.8 underwent isolated aortic valve replacement in our center from the year 2000-2010. Among these patients, follow-up data was available in 379 patients. Follow-up range was between 1 month and 10 years post-operatively. Prosthesis patient mismatch was diagnosed in 158 patients representing 41.8% of the total number patients available for follow-up. One hundred and nineteen (119) patients (31.5%) had mild to moderate PPM and 39 patients (10.3%) had severe PPM. There was no significant difference in terms of age, gender, co-morbid illness, pre-operative functional class, valve disease etiology, valve physiology, or the presence or absence of pre-op Left ventricular dysfunction between the two groups. There was no significant difference in the the duration of bypass and cross clamp times between the two groups. Mechanical prosthetic valves were implanted in 358 patients (94.7%) and bioprosthesis were implanted in only 20 patients (5.3%). PPM occurred more frequently among the patients (n= 17) who were implanted a bioprosthetic valve ($p < 0.001$). Among patients who did not develop PPM, significant reduction in left ventricular mass was noted at 1 month ($p = 0.000$), and after 5 years ($p = 0.001$). Reduction in LV mass index was noted to be significant at 1 month ($p=0.000$), 1 year ($p=0.001$ and even after 5 years (p-0.001) from surgery. For patients with mild to moderate PPM, significant reduction in left ventricular mass was noted at 1 month of follow-up. LV mass index reduction was also significant at 1 month and after 1 year, but not after 5 years ($p=0.120$) Among patients who had severe PPM, no significant reduction in left ventricular mass and LV mass index were noted, over time. The incidence of low cardiac output syndrome ($p=0.017$), mediastinal bleeding ($p=0.042$) and renal failure ($p=0.019$) was noted to be significantly higher among patients with PPM. Other complication such as post-op arrhythmia, pulmonary edema and congestion, surgical site infection, post-pericardiotomy syndrome

and stroke were noted in patients with PPM however, the incidence is not higher compared to those patients with no PPM. **Conclusion:** Prosthesis-Patient Mismatch has been shown to occur among patients who were operated on for isolated aortic valve surgery in our institution. The degree of severity of the PPM was shown to be related to the incidence of morbidities such as low cardiac output syndrome, re-operation for mediastinal bleeding and renal failure seen among this patient population.

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Perioperative Outcome After Saphenous Vein Harvest: Endoscopic vs. Open Technique

Redentor B. Juan, MD; Ronnie Cacas, MD, PATACSI

Background: Saphenous vein is the most widely used conduit in coronary artery bypass grafting, and harvesting these conduits entails a multiple incisions along the length of the thigh and leg. This standard open technique method in saphenous vein harvest provides a less technically demanding but with more complications such as hematoma, wound dehiscence, wound infection and post operative pain. A less invasive procedure, the Endoscopic Vein Harvest (EVH) can also be done with a more satisfactory result in terms of complications. This study was done to find out if there is no difference between the surgical outcomes of patients undergoing endoscopic and open technique in saphenous vein harvest. **Methods:** This prospective cohort study involved adult patients for elective coronary artery bypass grafting (CABG). Data points include, total harvest time, quality of vein harvested, postharvest complications. All patients scheduled for elective coronary artery bypass graft were enrolled in this study. The method of vein harvest, harvest time, and number of incisions were documented. Post-operative complications as to the degree of pain, occurrence of wound infection and hematoma and dehiscence were also noted. Pre-operative evaluation as to presence of co-morbidities: ESRD (end stage renal disease), uncontrolled DM, PAOD (peripheral artery disease) were documented. **Results:** A total of 231 patients were included in this study, 175 are in the open technique and 56 are in the EVH group, with a mean age of 60.17 years and 58.34 years respectively. There are 130 or 74.2% of the 175 patients in the open technique group developed ecchymosis compared to 47 out of 56 or 83.9% in the EVH group with a p-0.151. Hematoma formation was 9 in the open group and 2 in the EVH group which accounts for 5.14% and 3.57% respectively, (p-1.000). Wound infection was higher in the open technique group with a 6.85% compared to 3.56% in the EVH group. (p-0.527). There was 1 or (0.57%) wound dehiscence in the open technique group and none in the EVH group. The overall outcome in the occurrence of complication the 2 groups was 48 (85.71%) in the EVH group and 135 (77.14%) in the open technique group with a p value of 0.190. **Conclusion:** There were no significant difference in the occurrence of complications; ecchymosis, hematoma formation, wound infection and wound dehiscence in both open technique and in the EVH group in saphenous vein harvest.

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Atrial Versus Biatrial Approach for Cardiac Myxomas: a Philippine Heart Center Experience

Redentor B. Juan, MD; Samuel Andin, MD

Background: The standard approach in excision of left atrial myxomas usually entails a bi-atrial approach in which a left atriotomy is done first to explore the attachment of the myxoma to the septum then a right atrial incision is done and the mass is delivered thru the right atrial incision. In this study, we compare the 2 techniques (Atrial vs. Bi-atrial Approach) in LA myxoma excision in terms of operative time, bleeding, re-operation, mortality. **Methods:** The records of all patients who underwent surgical resection of LA myxoma from January 2008 to October 2009 were reviewed. Demographic as well as operative data were obtained. Patients are grouped according to surgical approach used (Single atrial vs. Bi-Atrial). The operative time which includes cross-clamp time and bypass time was compared. Incidence of re-operation, bleeding and mortality was also determined between the 2 groups. **Results:** Between January 2008 to October

2009, 18 cardiac myxomas were surgically removed at Philippine Heart Center. There were 12 females and 6 males with a mean age of 50. Emergency LA myxoma excision was done in 4(22%) of patient and the rest was done electively. Right atrial approach was done in 4 (22%) patients and 14 (77%) patients underwent the bi-atrial approach, of the 14 patient who underwent the bi-atrial approach, 2 of which has concomitant mitral valve repair and 1 patient had Coronary Artery Bypass Grafting. In this study, t h e age, hospital stay, ischemic time (cross-clamp time), and the bypass time was comparable in the 2 groups with no significant difference with a p-value of 0.220, 0.204, 0.929 and 0.810 respectively. The mortality observed in the 2 groups was not significant with a p-value of 1.000. Two (11%) patients had morbidity, one with intraoperative myocardial infarction (MI) and the other one with arrhythmia post operatively. No re-operation nor bleeding was observed in this study. **Conclusion:** In this study, the single atrial approach (Right Atrial in Left Atrial Myxoma) excision was comparable and no significant difference in terms of ischemic time, bypass time, hospital stay and mortality with the standard bi-atrial approach.

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Early Outcome of Off-Pump vs. On-Pump in Patients with Multi Vessel Coronary Artery Disease in Philippine Heart Center

Ronald Winardi Kartika, MD; Lorenzo Rommel Cariño, MD

Background: Early survival in off-pump coronary artery bypass (OPCAB) patients is reported to be as good as that of conventional coronary artery bypass grafting (CABG). However, it remains unknown whether midterm cardiac outcome after off-pump surgery is similar to that for the on-pump procedure. **Methods:** We enrolled consecutive patients admitted for coronary artery bypass grafting surgery. We divided them into two: those who underwent OPCAB and those who underwent conventional CABG. We followed them up during the hospital stay and observed for the occurrence of outcomes. **Results:** One hundred forty OPCAB patients (57.73 ± 9.86 y) were compared to a case-matched ± 9.86 y) were compared to a case-matched contemporary group of CABG patients (58.63 ± 8.96 y). In-hospital and midterm outcome data are presented. Follow-up was 90% complete. The mean number of distal anastomoses per patient was 1.9 (0.8) and 2.4 (1.0) in the OPCAB and CABG group, respectively. Grafting according to treatment plan was 100% in both groups. Duration of mechanical ventilation, ICU stay and hospital stay were shorter in the OPCAB group. The incidence of atrial fibrillation was similar. There were no differences in in-hospital complications. **Conclusion:** OPCAB surgery is a safe and reproducible technique, yielding short-and midterm outcomes comparable to conventional CABG.

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Predictor of Early Mortality and Morbidity in Mitral Valve Repair for Rheumatic Mitral Valve Disease: Philippine Heart Center experience

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Background: Mitral valve repair is feasible for patients with degenerative or ischemic heart disease, however, the appropriateness of repair for rheumatic heart disease remains controversial. The aims of this study is to evaluate the predictor of outcome of mitral valve repair at the Philippine Heart Center (PHC) from review of clinical and echocardiographic record of all patients who underwent this procedure from January 1999 to December, 2009. This also aims to determine predictors of early mortality and morbidity such as arrhythmias, stroke, renal failure, re-operation, prolonged intubation in patients who underwent mitral valve repair in rheumatic mitral valve disease. **Methods:** We follow-up the early outcome of mitral valve repair in population rheumatic mitral insufficiency regarding the complication and the mortality rate. **Results:** We included 391 patients with 241 underwent open mitral commissurotomy (OMC) and 150 underwent non-OMC mitral valve repair. There were 4 mortalities observed. The average age is 49.7 +13.2 and 58.1 +11.2 for OMC and non-OMC repair respectively. Majority were females. Majority had pre-operative atrial fibrillation

Conclusion: In our experience, a variety of surgical repair techniques can be applied successfully to patients with rheumatic mitral valve disease. Early results obtained with mitral valve repair for rheumatic mitral valve disease were satisfactory. It is our recommendation that mitral valve repair be performed whenever possible in rheumatic heart disease.

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Determinants of Outcome in Neonates Undergoing Modified Blalock-Taussig Shunt: A Philippine Heart Center Experience

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Background: Systemic pulmonary shunt is a widely accepted form of palliation for neonates with congenital cyanotic heart disease. The purpose of this study is to review our experience of Modified Blalock – Taussig shunt in neonates and to identify factors determining the outcome after surgery. **Methods:** From January 2005 to August 2010, the medical records of neonates with cyanosis and severely decreased pulmonary blood flow and who underwent MBTS were reviewed. Demographic, clinical and intraoperative parameters were assessed. Mortality rate was determined. **Results:** The mean age was 13 days (range 2-30); mean weight 3.089 ± 0.627kg (range 1.7-4.3 kg). The MBTS was performed in 34 patients via midsternotomy and left thoracotomy in 2 patients. The mortality rate was 18 patients (50%). Analysis revealed that duration of operation in hours of 3.270 ± 1.434 (p-value0.041) and postoperative 02 saturation of 78.76 ± 11.470 (p-value 0.006), were considered to be early predictors of mortality. **Conclusions:** Modified Blalock-Taussig shunt remains to be an effective palliative measure in neonates with congenital cyanotic heart disease. In our study, both the prolonged duration of operation and and low post-operative O2 saturation present as a risk factor for early mortality.

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Off-Pump Glenn Shunt, the Philippine Heart Center Experience: A case series

Ramiro Thadeus P. Pablo, MD

Background: The bidirectional glenn shunt has been widely used as a palliative procedure for congenital heart diseases, such as single ventricle anomalies. The original glenn shunt was done without the use of the cardiopulmonary bypass machine, however, today it is commonly done "on pump". With the use of CPB are the inherent risks (e.g. bleeding) and added costs. **Methods:** We reviewed the charts of all patient who underwent glenn shunt procedure from January 2008 – May 2010. We reviewed the charts, noted the patients' characteristics, operative and hospital course and follow up for six months. We reviewed the OR techniques and noted the anesthesia hemodynamic monitoring. **Results:** A total of 44 patients underwent the said operation. Eight of these cases were done without the use of the cardiopulmonary bypass. There were no untoward incidents intraoperatively, 5 patients tolerated the procedure well and had unremarkable postoperative courses. Five patients were extubated on the same day, 2 patients on the 1st post op day and one patient on the second post op day. The average length of intubation was one day. Five patients had unremarkable courses after operation. The highest CVP reading preoperatively was 38mmHg with an average of 29mmHg. The average hospital stay after operation was 8 days. **Conclusion:** With the positive outcomes in our patients, we propose that the procedure be done off pump in carefully selected patients. We also give our recommendations on additional monitoring strategies for patients who will undergo the procedure.

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Repair of Coronary Artery Fistula: Philippine Heart Center Experience

Samuel Yadao, MD

Background: A congenital coronary artery fistula (CAF) is a direct communication between a coronary artery and a cardiac chamber, the coronary sinus, the vena cava, the pulmonary artery, or pulmonary veins close to the heart.

The natural history of coronary artery fistulas is such that they tend to increase in size, and without surgery the patients do not have a normal life expectancy. A review on the surgical outcome from our experience will benefit both the clinician and the surgeon as compared to other institutions experience. This study aims to describe demographic, clinical characteristics, surgical outcome of coronary artery fistula, the presenting symptoms of CAF, the most common site of occurrence of CAF and its drainage, the surgical procedure and outcome of CAF and the mortality and morbidity of CAF after surgery. **Methods:** We conducted a chart review of patients who were diagnosed to have coronary artery fistula at Philippine Heart Center from January 1998 to November 2009. **Results:** A total of 23 patients with CAF were included, 12 males and 11 females. The age range was from 11 days old to 55 years old, 14 pediatric patients and 9 adults. Congenital heart disease was identified in 18 cases and rheumatic heart disease in 5 cases. Isolated CAF were noted in 15 cases and 8 cases were with associated cardiac lesions which require additional surgical procedure. Most common presenting signs and symptoms were continuous murmur. Coronary artery fistula ligation was done in fourteen patients; seven had CAF closure, one had CAF transaction and one had plication together with the aneurysmal sac. The average length of hospital stay was 17 days (range of 5 to 77 days). There was no operative mortality from our study, however morbidity noted were pneumonia (3 patients, 13%), acute renal failure (2 patients, 8%), complete heart block (1 patient, 4%), and upper gastrointestinal bleeding (1 patient, 4%). **Conclusion:** Careful analysis of the clinical data and proper diagnostic modality can accurately indicate a diagnosis of coronary artery fistula. Appropriate surgical techniques can provide satisfactory results in the majority of patients. The goal of surgical intervention is to close a fistulous connection while preserving coronary artery anatomy. A coronary fistula may be safely closed without CPB when the lesion is discrete and its location and size are appropriate.

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Outcomes of Urgent Coronary Artery Bypass Grafting After Acute Coronary Syndromes According to Timing of Surgery

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Background: Urgent coronary artery bypass grafting (CABG) after acute coronary syndromes (ACS) has evolved in the past years to include a more heterogenous group of patients with a more varied range of symptoms and severity. The current status of practices and outcomes of these cases in a high-volume center such as the Philippine Heart Center (PHC) is not well documented. It is the objective of this study to determine the in-hospital outcomes of patients undergoing urgent CABG after ACS at the PHC. **Methods:** Patients admitted at the PHC diagnosed with ACS for CABG in the same admission were included in the study. A total of 93 patients were enrolled. Data were gathered from the patient's charts, noting baseline characteristics and pre-operative cardiac indices, as well as the presence of risk factors. Timing of surgery after ACS was noted, with intra-operative data such as hypotension and the need for intra-aortic balloon insertion at the OR also recorded. The cardiopulmonary bypass time and cross clamp time were recorded and post-operative in-hospital outcomes such as mortality and morbidity, length of stay and common complications were gathered. **Results:** In this cohort study, the mean age of the subjects was 61.04 years old with a 3:1 male preponderance. Hypertension was present in 89% of all patients, while almost third had diabetes. Fifty-eight percent of patients had LV dysfunction, with about half of all patients with intra-aortic balloon counterpulsation support preoperatively. More than 95% of patients had 3-vessel coronary artery disease or the presence of left main involvement. Of the 93 patients, 51 were from Group 1 (1-7 days after ACS), 27 were from Group 2 (8-14 days after ACS), and 15 from Group 3 (>14 days after ACS). Left ventricular ejection fraction from ST-elevation myocardial infarction (STEMI) patients was found to be significant among the groups. Hypotension within 48 hours of admission as well as prebypass hypotension were more common in Group 1 patients with STEMI. Bypass times and cross clamp times were longer in STEMI cases, though average vessels grafted were similar for all ACS classifications. Revascularization was completed in more that 80% of all patients, with blood component use similar among groups., irregardless of timing of surgery. Length of post-operative hos-

pital stay was significant in non-ST-elevation myordial infarction (NSTEMI) patients with the most most number of days in Group 3 patients. All cause mortality rate was computed at 9.7%, with 4 of the 9 patients from Group 1 patients with STEMI. **Conclusion:** Among patients with acute coronary syndrome, the presence of low ejection fraction in the setting of STEMI may affect outcomes. Furthermore, a longer post-operative stay may be expected among patients with NSTEMI operated two or more weeks after acute coronary syndrome. Morbidity and mortality of patients after urgent CABG for ACS may be affected by the presence of STEMI and early surgery. Timing of urgent coronary artery bypass grafting may remain to be arbitrary and dependent on the clinical status of the patient.

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Empiric Activated Clotting Time (ACT) Monitoring Versus Non ACT Monitoring Prior to Cardiopulmonary Bypass: a cohort study

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Background: In cardiac surgery, heparin administration is an essential step before establishing cardiopulmonary bypass. This prevents the nonphysiologic stimulus of CPB which causes massive activation of the hemostatic system, To counter the anticoagulation effect of heparin, protamine is given immediately after bypass procedure. Prior to the commencement of cardiopulmonary bypass (CPB), activated clotting time (ACT) is determined in a structured manner. Is is determined 5 minutes after heparin 3mg/kg induction, and every 30 minutes while the patient is on CPB, and 10 minutes after heparin reversal with protamine. However necessary heparin titration during CPB, several patients were noted to have been given heparin 3mg/kg prior to CPB but no ACT determination were taken 5 minutes after heparin induction. Do patients undergoing cardiopulmonary bypass with no serial ACT determination will have similar post-operative outcome as those who underwent serial ACT determination? **Methods:** This is a cohort study which aims to compare the postoperative outcomes in terms of post-operative CTT drainage and cerebrovascular events among patients who underwent ACT monitoring 5 minutes post heparin 3mg/kg administration and those who do not have ACT monitoring 5 minutes after. Data were analyzed using the Statistics/Data Analysis (STATA version 11.0). T-test and Levene's Test and and Chi-Square test were done in comparing the baseline characteristics of the study population between the two groups. Univariate Analysis of Variance and Chi-Square tests were likewise used to analyze the outcomes in terms of post-operative CTT drainage and CVA. **Results:** A total of 139 patients were included. The data shown that the subjects in those with ACT determination and those without ACT determination are comparable in terms of demographic characteristics such as age, gender, type of surgery and co-morbidities. As to comparing the CPB variables play vital roles as factors that can contribute to the post-operative outcome of patients in terms of bleeding and other complications. There is a significant increase in the chest tube drainage in the non ACT monitoring group as compared to the group which monitors ACT. With regards to the incidence of CVA, the data is inconclusive since. The study have shown that 96% of patient who underwent monitoring of ACT prior to initiation of CPB have achieved the desired level even with a single dose of heparin, indicating that the heparin dosage is adequate and would favor more or non ACT monitoring, but it does not discount the fact that still 4% among this population may have developed, in one way or another, resistance to heparin hence the desired ACT level may not be achieved, resulting to a catastrophic post-operative outcome. Therefore prudence requires that ACT determination prior to initiation of cardiopulmonary bypass, as per anti-coagulant protocol, should be strictly followed. **Conclusion:** The data from the study have shown that there is a significant increase in the post-operative CTT drainage among patients without ACT monitoring after heparin administration. Based on the literatures reviewed, the mechanism can be best explained by inadequate anticoagulation among this group since the other factors present which are possible contributory are notcomparable. With regards to the incidence of cerebrovascular incident, the data would not support any conclusive evidence

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The Use of Berlin Questionnaire vs. STOP Questionnaire as Screening Tool Among Filipino Patients Undergoing Coronary Artery Bypass Surgery at Risk for Obstructive Sleep Apnea

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Background: Obstructive sleep apnea (OSA), a common disorder that is often undiagnosed in many patients including a number who require surgery, is strongly associated with risk for perioperative complications. Two internationally validated questionnaires were used as a screening tools in identifying surgical patients at risk for obstructive sleep apnea and these are the Berlin questionnaire and the STOP questionnaire. The objective of this study is to determine if risk stratification for obstructive sleep apnea using Berlin and STOP questionnaire can be associated with post operative complications. **Methods:** A prospective cohort study involving patients admitted for elective coronary artery bypass surgery. We administered the Berlin and STOP questionnaires on all the subjects. The subjects were risk stratified using the two questionnaires. Postoperatively, the patients were evaluated as to the number of hours spend on mechanical ventilator, rate of possible re-intubation, number of days spend in the intensive care unit, mean hospital stay and mortality. Postoperative complications like new onset arrhythmias, respiratory failure, pulmonary edema and neurologic complications (confusion, agitation, excessive drowsiness and stroke) will be observed and correlate according to group of patients (high or low risk). **Results:** The presence of increasing BMI (p value=0.042) and neck circumference (p value=0.041) in the high risk group (Berlin category) were found to have statically significant result. None of the aforementioned factors were identified among high risk group as categorize by STOP screening tool. The only identified risk factor among high risk group in both Berlin and STOP questionnaire is the presence of hypertension (p value = 0.004 and 0.00, respectively) identified among patients. **Conclusion:** Both the Berlin and STOP questionnaire can identify patients as high or low risk of probable obstructive sleep apnea and their computed statistical agreement (p value = 0.00) was significant.

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Preoperative Pulmonary Risk Assessment of Pulmonary Arterial Hypertension Patients Undergoing Cardiac Surgery

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Background: Clinicians involved in the management of patient undergoing surgery needs to be aware that postoperative pulmonary complications are a major cause of morbidity, mortality, prolonged hospital stay, and increased cost of care. In patients with pulmonary arterial hypertension (PAH), similar findings have been described previously in case reports, small series, and retrospective analysis of surgical databases. Consequently, substantial efforts should be made to predict, which patients are at increased risk for developing such complications and to identify techniques that can be used to prevent them. Preoperative risk assessment is a critical part of this process and one that is increasingly being performed in the outpatient setting. However, no single study supports that similar risk factors may predict occurrence of postoperative pulmonary complications in patients with PAH. **Methods:** This is a prospective cohort study involving patients with pulmonary hypertension undergoing cardiac surgery. Clinical and laboratory parameters were obtained and subjects followed up during hospitalization to observe for the occurrence of post operative pulmonary complications. **Results:** Only 19% of the patients in this cohort developed post operative pulmonary complication which is mainly postoperative pneumonia. Among the preoperative clinical factors evaluated, both the severity of pulmonary arterial hypertension (p=0.004) and WHO functional class (p=0.018) were significantly associated with the development of postoperative pneumonia. Age (p=0.541), BMI (p=0.637), smoking history (p=0.796) and presence of co-morbidities were not significantly associated with the development of postoperative pneumonia. Similarly, initial PaO_2, $PaCO_2$ levels, type of ventilatory defect, and 6MWD (p=0.165) test did not correlated significantly to postoperative outcome of these patients. **Conclusion:** The severity of pulmonary arterial hypertension and WHO functional class predicts occurrence of postoperative pneumonia in this cohort.

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Predictors of Sleep Disordered Breathing among Pediatric Patients with Congenital Heart Disease: A Prospective Risk Factor Analysis

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Background: Children with cyanotic congenital heart disease live with baseline oxygen saturations in the mid 70's, so that they exist on the steep part of the oxyhemoglobin dissociation curve. These patients are at increased risk for the hemodynamic variations occurring during apneas/hypopneas even when they are more subtle, namely during sleep disordered breathing. Thus, children with congenital heart disease especially the cyanotic type who experience more frequent apneic events during sleep will have an increased risk of interstage mortality and that the combination of the two conditions would lead to worsening cardiac symptoms and complications. The increased risk of pulmonary hypertension and right ventricular (RV) failure in patient with sleep disordered breathing (SDB), the long-term outcomes for children with congenital heart disease could be adversely affected since the etiology of pulmonary hypertension is believed to be secondary to the hypoxia and hypercarbia seen in chronic airway obstruction paired with the sympathetic overstimulation caused by frequent sleep arousals. The objective of this study is to determine prevalence of sleep disorder breathing among pediatric patients with congenital heart disease and identify risk factors associated with sleep disorder breathing among pediatric patient with congenital heart disease. **Methods:** This is a prospective cohort risk factor analysis. Included in the study are pediatric patients Pediatric patients with the underlying diagnosis of congenital heart disease between 6 and 16 years of age seen at the Pedia - OPD and Pediatric ward at Philippine Heart Center was identified. A validated 22 items questionnaire for the screening of SDB for pediatric patients by Chervin study was performed with institutional approval. Part one consists of the Pediatric Sleep Questionnaire (PSQ), scores of ‡8 were considered positive for SDB. Part two consisted-of subjective assessment of the subject's cardiovascular and respiratory symptoms, airway surgery, and history of prematurity and objective assessment of academic performance. Continuous numerical clinical variables were converted to dichotomy and entered into stepwise logistic regression analysis. All odd ratios of greater than 1 with p-values less than .05 were considered significant covariates. All p-values less than .05 were considered statistically significant. **Results:** A total of 206 children met the inclusion criteria and were included in the final analysis. The prevalence of sleep disordered breathing (SDB) was high at 63.1%. Among the factors analyzed, an increased frequency of pulmonary diseases (greater than 7 times/year) was statistically correlated with increased PSQ scores (OR=1.2, p=1.073-1.35, p=.002). Likewise, early palliative repair (OR=11.49, 95% CI 2.55-51.86, p=.001) was statistically associated. A high total cardiac score is almost four times associated with increased PSQ ratings (OR=3.78, 95% CI 0.70-1.02, p=.018).Learning problems were likewise associated (OR=2.31, 95% CI 1.43-5.44, p=.002). Not associated were age, sex, body mass index, neck circumference, Mallampati score prematurity, arrhythmia, tonsillectomy, and age of palliative and primary repair, the type of congenital heart disease. **Conclusion:** Increased frequency of pulmonary diseases and early palliative repair was statistically correlated with increased Pediatric Sleep Questionnaire scores. A high total cardiac score is almost four times associated with increased PSQ ratings. Hence, patients with congenital heart disease and Sleep Disordered Breathing are more likely to have worse cardiac symptoms and poor school performance.

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The Agreement Between the Chest CT scan and Chest x-ray Finding in Tuberculin Positive Children- A Prospective Study

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Background: Because of the lack of sensitive test to confirm the diagnosis of pediatric TB, attempt to correlate chest radiograph and chest computed tomography (CT) scan among children with tuberculin positive skin test would be an important diagnostic modality in confirming diagnosis of TB disease. This study aims to determine the level of agreement between chest radiography and Chest CT Scan among tuberculin positive children. **Methods:** This is a cross-sectional study involving all children ages 6 months to 18 years old, with a tuberculin positive test as interpreted by conventional criteria, with symptoms like cough, history of contact, cough and other non-specific symptoms like fever, weight loss, hemoptysis, anorexia, dyspnea, weakness and diarrhea with parental informed consent. Chest radiographs were interpreted by 3 radiologists blinded to the clinical diagnosis of the patients and chest CT scan were read by three readers blinded to both the clinical diagnosis and results of previous chest radiographs. A concordance rating of positive or negative significant lymphadenopathy was obtained by kappa-values at 0.05 level of significance. **Results:** A total of 98 children met the inclusion criteria and were included in the final analysis. There were 49% males and 51% females with the ages 4-5 and 9-11 commonly affected among males and 6-8 years among females. There was poor inter-rater agreement for other forms of lymphadenopathy on chest radiography same for reticular lesions (100%). The three readers had high inter-rater agreement on CT scan (87.5% -93.8%), highest for granuloma and peribronchial nodes (both 100%). Levels of inter-rater agreement for radiography against CT scan in the discrimination of abnormal from normal findings were low. The overall agreement between the chest x-ray compared to chest CT scan had a kappa value of 0.084 ± 0.095 with a p value of 0.189 which is not statistically significant. **Conclusion:** There is low agreement in the interpretation of chest CT scan versus chest x-ray in tuberculin positive children. More precise descriptors for positive CT scan for diagnosing Primary tuberculosis in children in contrast with chest radiographs in which must be sought to accurately standardize the readings since the sensitivity and specificity of chest x-ray were only 75% and 67 % respectively. The over-all positive predictive value for diagnosing TB disease in children using chest chest x-ray was only 59% compared to chest CT scan which was 98%.

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Predictors of Respiratory Failure After Cardiac Surgery

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Background: Respiratory failure is an important and morbid complication following cardiac surgery. It has a high mortality and can lead to prolonged hospital stay and added financial burden. Previous studies have identified different potential risk factors to the development of respiratory failure post cardiac surgery. However, those studies dealt mainly with post CABG patients. This study was done to analyzed the incidence of respiratory failure post cardiac surgery and identify risk factors associated with the development of respiratory failure. **Methods:** We analyzed 100 patients from the medical records of the Philippine Heart Center from June - December 2009 who underwent cardiac surgery. Patients who develop respiratory failure were compared to those who did not develop respiratory failure. **Results:** The Incidence of respiratory failure was 14%. The highest incidence of respiratory failure was seen among patients who underwent combined CABG/Valve surgery. On multivariate analysis: Renal failure, Ejection fraction of <30% and combined CABG/Valve surgery were identified as independent predictors for the development of respiratory failure. **Conclusion:** This study showed that respiratory failure is a common and serious complication post cardiac surgery and it identified risk factors that will enable physicians to properly identify high risk patients.

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Utility of Preoperative Lung Function in Predicting Regression of Pulmonary Hypertension After Surgical Correction of Mitral Stenosis

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Background: Rheumatic heart disease, predominantly mitral stenosis is a chronic disease that produces an increase in the left atrial pressure and consequently venous pulmonary hypertension. Mitral stenosis is generally caused by rheumatic involvement of the mitral valve apparatus. The clinical manifestations of mitral stenosis are caused by mechanical obstruction that impairs ventricular filling through the mitral orifice. Pulmonary hypertension in MS develops because of retrograde transmission of left atrial pressure, pulmonary arteriolar constriction, interstitial edema, and obliterative changes in the pulmonary vascular bed. Preoperative lung function which could be obtained from spirometry can evaluate respiratory reserve in cardiopulmonary patients who will undergo surgery. However, data on the use of spirometry in predicting the rate and extent of regression of preoperative pulmonary artery hypertension is limited. **Methods:** In this study, we determined the usefullness of preoperative lung function by spirometry in predicting regression of pulmonary hypertension after surgical correction of mitral stenosis by performing a prospective cohort study of 20 patients who underwent mitral valve surgery at Philippine Heart Center from July 2009 to December 2009. **Results:** Among the twenty patients included in the study, only one had normal spirometric study and another one had a mild obstructive lung abnormality. Majority of the patients had restrictive lung abnormality comprising of eighteen (18/20) patients Nineteen (19/20) patients had regression ofPAP. All of them were noted to have restrictive spirometric abnormality (18 patients) or normal spirometric result (1 patient). There was only one patient who did not have regression of PAP and upon review of the data, this patient was found to have a mild obstructive spirometric abnormality.

Correlation of the severity of restrictive lung defect with the change in pulmonary artery pressure classification among nineteen patients with normal or restrictive spirometric study is determined using a spearman correlation and result showed lack of correlation with a spearman coefficient of 0.041 and p-value of 0.863. **Conclusion:** This study showed that majority (19/20) of rheumatic heart disease patients particularly mitral stenosis will have a preoperative spirometric abnormality of restrictive pattern, one patient (1/20) with obstructive patterns and another one patient (1/20) with normal study. It is also shown that among the study group, almost all patients (19/20) will have regression of pulmonary hypertension after surgery. However, we cannot conclude in this study that preoperative lung function is not predictive of regression of pulmonary hypertension after surgical correction of mitral stenosis due to inadequacy of sample size.

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Flexible Fiberoptic Bronchoscopy (FOB) in the Evaluation and Management of Pediatric Patients: Clinical Experiences in a Referral Center for Cardiac Surgery

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Background: To present the role of flexible fiberoptic bronchoscopy in the evaluation and management of pediatric patients. **Methods:** The medical records of infants and children who underwent FOB at the Philippine Heart Center from January 1998 to June 2009 were reviewed. Information collected from the medical records included the following: demographic data, indications for FOB, imaging results, disease distribution, hemodynamic/ventilator status before the procedure, anatomic/structural/dynamic findings, any change in the management (conservative to surgical; change in antimicrobial treatment), change in clinical status or chestradiograph findings. The bronchoscopic reports of the patients which are filed at the Pediatric Pulmonology office were likewise reviewed. **Results:** A total

of 57 FB were performed in pediatric patients, between January 1998 and June 2009. These 57 procedures were done in 55 children, with a mean age of 6.85 years old (1 month to 18 years old). Out of the 57 total procedures, 20 were performed on children with cardiac disorders, 19 (53%) of which had congenital heart disorders. The indications for FOB in our center were for the evaluation of persistent atelectasis (28.1%), followed by evaluation of stridor (22.8%), and then for the evaluation of recurrent cough or pneumonia (17.5%). Among the airway pathologies found via FOB, airway dilatation (26.1%) and airway inflammation (24%) were the most common findings. These were followed by compression of the right main bronchus (13%) and airway obstruction (10.1%). **Conclusion:** The fiberoptic bronchoscope is a valuable tool for establishing diagnosis and plan of management in pediatric patients with airway disorders. Congenital heart diseases and pulmonary disorders require intensive evaluation and timely management, and we believe that FOB is a safe procedure that can be performed in children presenting with these conditions. Specialty centers should acquire the necessary skills, equipment and manpower to perform FOB on children with cardiac or pulmonary disorders.

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Prolonged Mechanical Ventilation Among Children with Congenital Heart Disease Undergoing Cardiac Surgery in Philippine Heart Center: A Risk Factors Analysis

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Background: Most children who undergo congenital heart surgery require postoperative mechanical ventilation (MV). This study was performed to determine factors contributing to prolonged mechanical ventilation (PMV) in children following surgery for congenital heart defects. **Methods:** This is a prospective cohort study of pediatric patients who underwent cardiovascular surgical procedures. They were classified according to the duration of mechanical ventilation (MV): group 1 (MV for < 7 h) and group 2 (MV for >72 h). Continuous variables were compared using independent T-test and chi-square test. Independent variables were dichotomized and entered into a step-wise multiple regression to determine the independent predictors. **Results:** Total of 120 children were studied. The average duration of MV in group 2 was 81.7h versus 22.7h in group 1. Among all preoperative variables analyzed, age of <4 yr was almost three times associated with PMV, if BMI was <11 kg/m^2, a palliative type of surgery, a WBC>15T per mm^3 and a preoperative chest radiograph of hypovascularity. Presence of cumulative positive balance was associated with PMV as postoperative factors. **Conclusion:** Children <4 year old with low BMI, elevated white blood count and hypovascularity in chest radiograph, who underwent emergency cardiac surgery and with fluid retention postoperatively are risk factors for PMV.

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Outcome of Pulmonary Rehabilitation Among Difficult To Wean, Mechanically Ventilated Patients Admitted at the Philippine Heart Center, a randomized controlled study

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Background: Pulmonary rehabilitation has shown its benefit among patients with chronic obstructive pulmonary diseases even those with non-lung diseases. The idea that alternate care settings can provide alternatives among patients in the intensive care unit especially on patients on long term ventilation has led to the proposal that patients can undergo rehabilitation and see its immediate and long term benefits. **Methods:** Patients at the intensive care units who are termed difficult to wean were enrolled in the study. They were randomized using computer generated number into those who would undergo pulmonary rehabilitation and to those who would not. An exercise protocol was provided to the patient who will undergo pulmonary rehabilitation. The exercise protocol included: breathing exercises, cycle ergometry and upper body exercises. **Results:** Using the t-test for equality of means, results showed that patients who received pulmonary rehabilitation had

longer time off the ventilator, had shorter days hooked to mechanical ventilator and had shorter hospital stay. Results however showed no statistically significant values. With regard to discharge from the intensive care units, it was the same for those who did and did not receive pulmonary rehabilitation. Using Mann-Whitney U test, results showed that patients who underwent pulmonary rehabilitation develop more capability to do activities of daily living such as sitting up on bed, eating and combing hair. There were 7 out of 12 patients of the control group who did not undergo pulmonary rehabilitation but developed ventilator dependence compared to that in the study group which were only 3 out of 12. The results were not statistically significant. **Conclusion:** Although, there was limited number of subjects, mechanically ventilated patients who underwent pulmonary rehabilitation showed a trend for them having a longer time off the ventilator, had shorter days hooked to mechanical ventilator and had shorter hospital stay in days.

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Prevalence of Late Onset Asthma Among Elderly Patients: community based Study

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Background: Asthma occurs more frequently in the elderly than is usually appreciated and maytherefore be underdiagnosed and untreated. Although several studies report the characteristics of older patients with asthma, few studies have described patients with asthma after age 60 years. Despite the worsening national trends for asthma for the past 25 years, bronchial asthma in the elderly has not received as much attention as asthma among children and adult, partly because asthma is difficult to distinguish from chronic obstructive pulmonary disease and congestive heart failure in older age. This study would determine the prevalence of late onset asthma in one community and identify other related risk actors associated with it. The diagnosis of asthma would be based on using a respiratory written questionnaires and portable spirogram. **Methods:** This is a prospective cross-sectional study done from January 2009 - December 2009 involving elderly (age >60 years) residents of the community of Brgy. Holy Spirit Quezon City. Excluded were those already diagnosed with COPD or emphysema; those who a have significant smoking history (> 10 pack/year); those who have congestive heart failure and those who have history of childhood asthma. A roster of elderly living in the Brgy Holy spirit was obtained from the office of the senior citizen's office and/or Comelec office. Spirometry with a reversibility tests were performed and demographic characteristics were assessed. A diagnosis of asthma was made after according to the American Thoracic Society Criteria. **Results:** There were a total of 565 senior citizens that was screened. There were about 320 patients that are eligible, a portable spirometry was done. There were 105 patient confirmed with a diagnosis of asthma which shows a 12% (preferably 15% or greater improvement in FEV1 (i.e. at least 200ml) from the baseline 15 minutes after the use of an inhaled short acting B2 agonist (Salbutamol inhaler). About 210 patients showed no reversibility using a portable spirometry. **Conclusion:** This study found that the prevalence of asthma is 28%. Several factors including female gender,obesity and history of respiratory illness and the use of NSAID are associated with asthma. The majority of subjects who have asthma had a low scores on SGRQ which rated their health as fair or poor. Occupation such as farm-related also showed a positive association of asthma among elderly.

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The Accuracy of Hounsfield Unit CT Attenuation in Differentiating Transudative from Exudative Pleural Effusion Based on Light's Criteria

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Background: A non-invasive technique, such as CT scan, to determine whether pleural effusion is transudative or exudative would aid in therapeutic management especially in cases when thoracentesis is contraindicated. Aside from the financial advantage, this method would benefit patients with CHF and

concomitant transudative effusion (comprising approximately half of all patients with pleural effusion), since these patients usually do not require thoracentesis, hence preventing the complications inherent to thoracentesis and possible litigation. This study was done to determine the accuracy of Computed Tomography (CT) in characterizing pleural fluid into transudative and exudative based on attenuation values (Hounsfield Units); a non-invasive technique not being used for this purpose at this time. **Methods:** Patients with pleural effusion who had thoracentesis and chest CT done within 7 days of each were evaluated retrospectively over a 4 year period. Effusions are classified as transudates or exudates using Light's Criteria. The mean Hounsfield unit (HU) of an effusion is determined and a receiver operating characteristic (ROC) curve will be constructed to determine threshold values for classification on the basis of mean HU and to examine overall accuracy, using the area under the curve (Az). **Results:** Of the 110 exudates and 158 transudates, the mean attenuation of exudates (25.99 HU; [SD] 9.3 HU; range, 12–45 HU) was significantly higher than transudates (11.89 HU; 2.5HU; range, 5-19 HU), ($p = 0.00$). The overall accuracy of attenuation values for identifying exudates was high, $Az = 0.981$, standard error = 0.007, with the argest limitation being the overlap of exudates in the 16 to 18 HU range, which constituted 13% (35/268) of the total effusions measured. **Conclusion:** The mean attenuation of exudates is significantly higher than transudates as their accuracy is high. However, pleural effusions with HU's between 16 to 18 represent a gray area where clinical correlation is required prior to thoracentesis.

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The Utility of Ultrasound in Differentiating Transudative From Exudative Pleural Effusions

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Background: The sonographic patterns of pleural effusion are subclassified as anechoic, complex nonseptated, complex septated and n sonographic pattern; a non-invasive technique not being used for at this time homogeneously echogenic. A non-invasive technique, such as ultrasound, to determine whether these patterns can stratify a pleural effusion into a transudate or exudate would aid in therapeutic management especially in cases when thoracentesis is contraindicated. Aside from the financial advantage, this method would benefit patients with CHF and concomitant transudative effusion (comprising approximately half of all patients with pleural effusion), since these patients usually do not require thoracentesis, hence preventing the complications inherent to an interventional procedure and possible litigation. This study was done to determine the utility of ultrasound in characterizing pleural fluid into transudative and exudative based on ultrasound. **Methods:** The sonographic findings of 367 patients with pleural effusions were retrospectively analyzed. After thoracentesis, the nature of these effusions was established on the basis of Lights criteria (213 transudates and 154 exudates). The sonographic patterns of these fluids were reviewed blinded to the laboratory results. **Results:** Results showed that the two types of effusions could be distinguished on the basis of sonographic findings. Transudates were anechoic, whereas an anechoic effusion could be either a transudate or an exudate. Pleural effusions with complex septated, complex nonseptated, or homogeneously echogenic patterns were almost always exudates (92.2% sensitivity and 95.8% specificity). **Conclusion:** Sonography is useful in determining the nature of pleural effusion.

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RV/LV Ratio and Pulmonary Artery Thrombus Load Score in Pulmonary CT Angiography as Predictors of Clinical Outcome of Patients with Pulmonary Embolism

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Background: The ratio of the right ventricle to left ventricle short-axis diameters (RV/LV) and arterial thrombus load in the pulmonary arteries have been proposed as important parameters for

predicting right ventricular dysfunction (RVD) in pulmonary embolism (PE). This study was done to retrospectively quantify RVD using RV/LV ratio and pulmonary artery thrombus load score in pulmonary CT angiography and to assess the predictive value of these CT parameters for morbidity and mortality after the diagnosis of pulmonary embolism. **Methods:** All consecutive patients diagnosed with pulmonary embolism by pulmonary CT angiography at the Philippine Heart Center from October 2005 to August 2009 were included. Three readers assessed the extent of RVD by quantifying the RV/LV ratio and the extent of obstruction to the pulmonary artery circulation on the CT images, which were blinded for clinical outcome in consensus reading. Regression analysis was used to correlate these parameters with patient outcome. **Results:** There were a total of 44 patients with pulmonary embolism who were included in the study. Among the 44 patients, 36 survived and 8 did not. Based on the demographic characteristics of patients with pulmonary embolism between survivors and non-survivor, there was no significant difference, except for age, O2 saturation of >90 % and occurrence of congestive heart failure. Patients who were diagnosed with pulmonary embolism in the later age, with room air saturation of <90% and those with with congestive heart failure have increased risk of death. There was no statistical difference in the measurement of the RV/LV ratio among patients who survived and those who did not. It was also documented that PA thrombus load score could be associated with increased risk of death. The length of hospital stay showed no significant correlation with the RV/LV ratio and PA thrombus load score and there was no significant difference with the RV/LV ratio and PA thrombus load score among patients, based on the use of inotropes and the need for intubation. **Conclusion:** Pulmonary artery thrombus load score is a better predictor of survival among patients diagnosed with pulmonary embolism as compared with the RV/LV ratio. Patients with pulmonary embolism have a poor prognosis if PA thrombus load score is higher. Both PA thrombus load score and RV/LV ratio are not reliable predictors of in-hospital morbidity based on the length of hospital stay, use of inotropes, and the need for intubation, since it showed no statistical difference. However, because of the small number of patients included in this study, we cannot draw definite conclusions about this association.

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The Validity of Hyperdense Lumen Sign in Non-Contrast Chest CT Scans in the Detection of Pulmonary Thromboembolism

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Background: It is possible to identify high-attenuation clots in pulmonary thromboembolism using non-contrast computed tomography (CT) of the chest. Such detection may be crucial for timely initiation of appropriate therapy. This study was undertaken to determine the validity of the hyperdense lumen (high attenuation clot) sign in unenhanced chest CT in detecting pulmonary thromboembolism. **Methods:** Non-contrast and contrast-enhanced CT images of the chest of 121 patients who had undergone standard CT pulmonary angiography (pulmonary CTA) were reviewed separately. The absence or presence of luminal hyperdensities within the pulmonary arteries in the non-contrast images was determined. The average CT attenuation difference between the high attenuation clots and pulmonary arteries were computed. Findings in the non-contrast images were correlated with the contrast-enhanced images. **Results:** Twenty-five patients were positive for pulmonary thromboembolism in the pulmonary CTAs. Of these 25 patients, nine were positive for the hyperdense lumen sign in the non-contrast CT images. The hyperdense lumen sign has an over-all sensitivity of 36.0%, specificity of 99.0%, PPV of 90.0%, and NPV of 85.6% (kappa = 0.449; P-value < 0.001). In detecting central thromboembolism, the sensitivity, pecificity, PPV, and NPV of this sign were 66.7, 99.1, 88.9, and 96.4%, respectively (kappa = 0.740; P-value < 0.001). The sign was less sensitive in peripheral thromboembolism (kappa = 0.358; attenuation difference between P-value < 0.001). he mean (±SD)

the clot and pulmonary blood pool was 22.76 (±4.20) HU (P-value < 0.001). **Conclusion:** The hyperdense lumen sign is a useful indicator of acute pulmonary thromboembolism in non-contrast chest CT scans particularly in cases involving the central pulmonary arteries.

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Application of the American College of Cardiology Foundation/American Society of Nuclear Cardiology Appropriateness Criteria for Single-Photon Emission Computed Tomography Myocardial Perfusion Imaging in Philippine Heart Center

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Background: Myocardial perfusion imaging studies play an important role in the diagnosis and prognostic assessment of patients with suspected or known coronary artery disease. This study determined the appropriateness of the indications for myocardial perfusion imaging ofpatients referred to the Division of Nuclear Medicine of the Philippine Heart Center. **Methods:** Clinical information and myocardial perfusion imaging findings of patients who underwent myocardial perfusion imaging from January 2008 to December 2009 were reviewed. The ACCF/ASNC Appropriateness Criteria for SPECT Myocardial Perfusion Imaging was used to classify indications for referral. **Results:** A total of 700 patients with a mean age of 55 years old were included in the study. There were 504 patients (72%) in the appropriate category and majority of them had abnormal myocardial perfusion imaging results (70.2%). There is highly significant association between appropriateness category and myocardial perfusion imaging indings. Most of the referring physicians were cardiologists. There is no association between myocardial perfusion imaging results and specialty of referring physicians among appropriateness categories. **Conclusion:** The ACCF/ASNC Appropriateness Criteria for SPECT Myocardial Perfusion Imaging may serve as a guide for attending physicians in the management of their patients with suspected or known coronary artery disease.

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Role of Plasma Fibrin D-Dimers in the Screening and Prognostication of Patients with Acute Aortic Dissection

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Background: Acute aortic dissection (AAD) is a catastrophic illness. Prompt clinical recognition and definitive diagnostic testing are essential in the management of patients. The aim of this study is to determine the role of plasma fibrin D-dimers in the screening and prognostication of patients with AAD.**Methods:** Plasma fibrin D-dimers were determined in 42 chest pain patients (32 men, and 10 women; age range of 61 (19-80 years old) suspected with AAD. A definite diagnosis of AAD was confirmed with CT aortogram, or MRI and surgical report. The W.H.O. definition of MI was used in cases of acute myocardial infarction (AMI). Patients who did not have AAD or AMI were placed under the third group. **Results:** Comparison of D-dimers levels (ng/ml) between AMI (n=4), AAD (n=13) and non-AAD-non-AMI (n=25) showed a significant difference ($p<0.001$). When the patients were grouped into 4 namely AMI, AAD, aneurysm without acute dissection, and non-AMI-non-AAD, the D-dimer levels of the aneurysm group without acute dissection were also increased and there is a significant difference among the D-dimer levels of the 4 groups with a p of <0.01. Comparison of means between AAD versus aneurysm shows a significant difference at p of 0.015, AAD versus AMI at p of 0.002, and AAD versus non-AAD-non-AMI at p of 0.013. There was significant overlap of D-dimer

levels among AAD, aneurysm without AD and non-AMI-non-AAD even though the mean values were statistically different. All values of AMI, AAD and aneurysm without acute dissection were above the upper limit of normal which is 500 ng/ml. Cases of aneurysm with or without acute dissection were above 1100 ng/ml. AMI cases were all below 2000 ng/ml. Non-AMI-non-AAD group had the widest overlapping range of D-dimer levels with the AAD group and at times were within normal limits. Of the 13 patients in the group with acute aortic dissection, one (7%) with a D-dimer level of 9,980 ng/ml died within 30 days. **Conclusions:** D-dimer levels are elevated in many conditions with acute chest pain such as acute myocardial infarction, non-AMI CAD such as unstable angina, pulmonary embolism, and aneurysms with or without radiographic evidence of dissection. Elevated D-dimers of around 1,100 ng/ml are more reflective of aneurysms with or without acute dissection than levels of 500ng/ml. Most patients with AAD are normotensive than hypertensive. As a screening tool, the universal cut-off point of <500 ng/ml is useful in ruling out acute aortic dissection in the emergency room setting. Patients with levels above the cut-off (> 500 ng/ml) should be suspected for AAD and subsequent radiologic work-up is warranted to distinguish it from PE and to exclude concomitant AAD in AMI candidates for anticoagulation to prevent catastrophic consequences of such therapy. Highly elevated D-dimers cannot distinguish between AAD and other causes of chest pain (non-AAD non-AMI) and this should prompt more an urgent MRI or contrast-enhanced CT scan to initiate early and appropriate therapy.