

## **Abstracts for 5<sup>th</sup> Cardiac Society Annual Scientific Meeting, 2018**

### **1. The clinical detection and Activated management by using ICM in Brunei Darussalam**

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Implantable cardiac monitors (ICMs)/ ILR (Implantable loop recorder) are useful for long-term arrhythmia monitoring in patients with unexplained symptoms. According to Medtronic data, only 20% of syncope and 30% of cryptogenic stroke patients had diagnosed after 2 yrs. Cardiac syncope occurs in approximately 20% of syncope presentations. It is most often caused by an arrhythmia.

The newer device, Reveal LINQ is the most clinical validated one across cryptogenic stroke, syncope and atrial fibrillation. It is the most utilized device, data leveraged by clinical societies to develop treatment guidelines across indications. It provides actionable data to diagnose and treat even the most difficult to detect arrhythmias.

In Brunei Darussalam, We identified all patients who underwent ICM implantation at both Gleneagles JPMC and RIPAS hospital between 2001 and 2018, using diagnosis codes for device implantation.

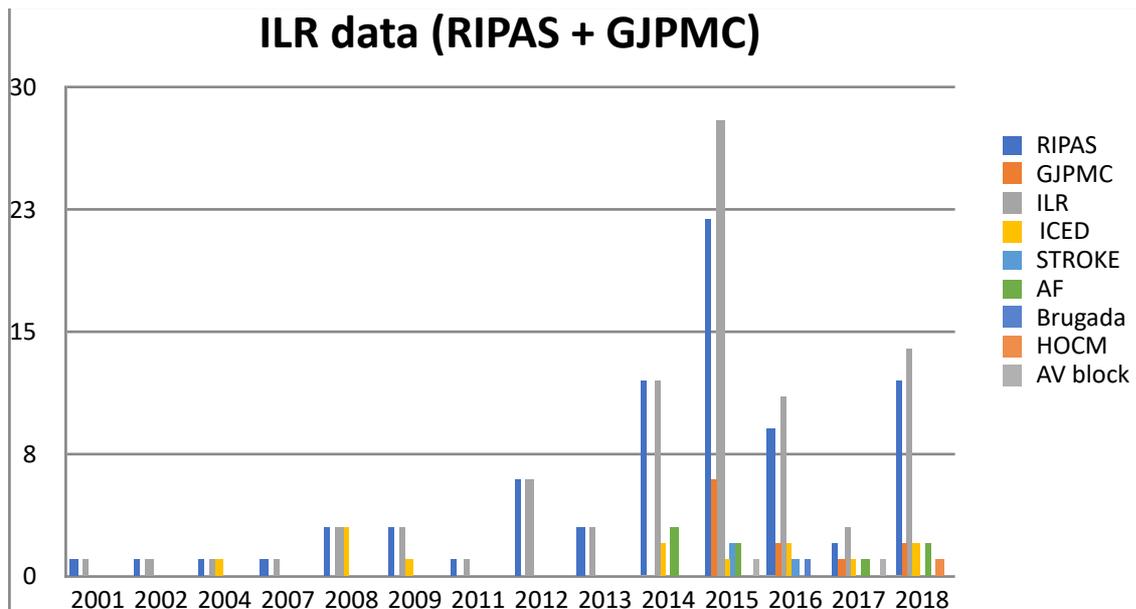
From 2001 to October 2014, Reveal XT had been used. The first Reveal LINQ implant was done on 22.10.2014. Hence, 9 out of 12 implants in the year of 2014 were Reveal LINQ and the remaining 3 were Reveal XT. From year 2015 onwards, we have been using Reveal LINQ at both RIPAS hospital and GJPMC.

From 2001 to 2018, a total of 88 patients with ICM devices were identified and all patients were analyzed including 23 Medtronic Reveal XT between 2001 and 2014, and 65 Reveal LINQ between 2014 and 2018.

Increased using of ILR implants was primarily tied to the rise of LINQ monitoring including 3 cryptogenic stroke patients and 8 cases of atrial fibrillation. Detection accuracy was similar between the devices. Of patients with total 88 ILR implants, 13 cases had received at least one intervention like Permanent Pace Maker in 11 cases and AICD in 2 patients. 9 patients received dual chamber pace maker for the indication of Sick sinus syndrome, 2 patients received dual chamber pace maker for Incomplete AV block, one single chamber ICD for patient with Brugada syndrome + positive EP study, one dual chamber ICD for patient with Apical HOCM + positive EP study.

Since the release of the LINQ device 2014, there has been an increase in the use of ICM implants among patients with atrial fibrillation. In CRYSTAL AF study, 84 days is median time to AF detection in cryptogenic stroke patients, 40% AF detection rate in 30 months.

Since ILRs have potential improvements in arrhythmia detection accuracy, it is the essential step on establishing the etiology in order to initiate an appropriate diagnostic and treatment strategy to prevent future events as well as to determine the prognosis.



## 2. Patent Ductus Arteriosus in Brunei Darussalam

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Objectives:

Our retrospective study aims to look at patients diagnosed with patent ductus arteriosus within a 5 year period in Brunei Darussalam.

Materials and Methods:

The national healthcare database was queried to identify all hospital patients in Brunei Darussalam who were diagnosed and coded with the ICD-10 diagnosis Q25.0, Patent Ductus Arteriosus (PDA) between 1 January 2013 to 31 December 2017. Individual case notes were inspected and relevant clinical details were tabulated in a spreadsheet prior to analysis.

Results:

From the 45 patients studied, there were 28 female patients (62.2%) and 17 male patients (37.8%). 16 patients (35.6%) were born pre-maturely. 1 patient (2.2%) showed a positive family history for PDA. Demographically, 28 patients (62.2%) originated from the country's main tertiary hospital followed by 11 patients (24.4%) from a secondary-care hospital and the remaining 6 patients were from smaller district hospitals. The average time from birth to confirmatory echocardiography was 122.2 days (Range 0 to 1658 days). 16 patients (35.6%) underwent surgical ligation of the PDA, an average of 186.6 days following confirmatory echocardiography (Range 13 to 986 days). All cases referred for surgery were successful and no mortalities were recorded during the 5 year study period. Device closure was undertaken in 1 patient (2.2%) and was offered to 3 other patients (6.7%) who remained undecided. From the non-intervention group, 9 patients (20%) achieved spontaneous closure of the PDA and did not require any intervention. The remaining 16 patients were managed conservatively. During the study period there were 3 mortalities (6.7%) in the neonatal period attributed to unrelated multiple co-morbidities.

Conclusion:

The nationwide management of PDA in the paediatric group depends greatly upon its initial detection. Successful management requires a multidisciplinary Heart Team approach comprising a Paediatric Cardiologist, Paediatric Cardiothoracic Surgeon and Paediatric Interventional Cardiologist who need to weigh the risk/benefits towards the individual treatment modalities.

Patent ductus arteriosus, paediatrics

### **3. One year outcome of various atrial fibrillation ablation strategies in Brunei Darussalam**

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#### **ABSTRACT**

**Introduction:** Atrial fibrillation is one of the most common type of arrhythmia that can lead to serious complications if left untreated. Pulmonary vein isolation, ablation lines and complex fractionated atrial electrograms are ablation strategies offered in Brunei to help convert the arrhythmia back to sinus rhythm.

**Materials and Methods:** The data of a total of 130 of patients who underwent ablation procedures between the years of 2014-2017 data were collected. Types of AF and outcomes of AF ablation strategies were noted. CHADS2 and CHA2DS2-VASc Score system were used to assess stroke risk of patients. Quality of life of patients were measured with EHRA score.

**Results:** In this study, most of the patients were male (70.0%) with a mean age of 56.8 (SD=10.28). 32.0% of patients had recurrence and among that 78.0% were mostly found to be in the non-paroxysmal AF group and 22% are from paroxysmal AF group. Therefore, there is an association found between type of AF ( $p<0.001$ ) and developing recurrent AF. Ablation strategies and recurrence rate in overall AF patients are significantly different ( $p=0.011$ ) whereas for persistent AF group and long-standing persistent AF are not statistically different. ( $p=0.603$  and  $p=0.660$  respectively)

**Conclusion:** Patients with paroxysmal AF have a higher rate of being AF free as compared to patients with non-paroxysmal AF. The type of ablation performed on paroxysmal group have an association with recurrence of AF. However, persistent and long-standing persistent AF patients should be carefully selected to identify those who might benefit from the ablation procedure.

**Keywords:** atrial fibrillation, ablation techniques, recurrence

### **4. Coronary Artery Anomalies (CAA) Detected on Cardiac CT in Brunei Darussalam**

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**Introduction:** Coronary artery anomalies (CAA) are congenital malformations that can lead to life-threatening complications. Although present at birth, they are often not diagnosed until late adolescence or till adulthood. Cardiac computed tomography (CCT) scans is regarded as an accurate diagnostic tool for defining anomalies. The aim of this research is to study the coronary artery anomalies (CAA) detected in patients undergoing CCT scans and to determine any correlation between age, ethnicity, gender, age and other risk factors such as blood pressure, cholesterol level, smoking, diabetes, family history and body mass index with CAA as well as to identify the common groups of CAA in Brunei Darussalam.

**Methods:** Data of 1040 CCT scan reports collected between November 2013 and November 2017 from Raja Isteri Pengiran Anak Saleha (RIPAS) Hospital were retrospectively analyzed. Both non CAA and CAA detected from the reports were compared with patient's demographic data and other clinical parameters collected from BruHims.

**Results:** A total of 36 coronary artery anomalies were identified in 1040 patients with an incidence of 3.46% and prevalence of 0.03%. Myocardial bridging was the most common with n=21(58.3%) among the CAA patients with an incidence of 2.02%. 10(41.7%) were found to have anomalies of origin and distribution and 26(72.2%) had coronary artery fistulae. These anomalies were found to be significantly associated with hypertension (42%; p=0.041).

**Conclusion:**

Coronary artery anomalies are not common in Brunei. Among the CAA detected, myocardial bridging and hypertension were more likely to be present in these patients. There were no significant associations between CAA with age, gender, ethnicity and other risk factors such as cholesterol level, smoking, diabetes, positive family history and body mass index.

**5. THE GENOTYPE-PHENOTYPE TRAITS OF BRUGADA SYNDROME IN BRUNEI DARUSSALAM**

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**Introduction:** Brugada syndrome (BrS) is an inherited channelopathy. Mutations in at least 12 genes encoding the sodium, calcium and potassium channels have been associated with BrS. SCN5A mutations account for 30% of BrS. We aim to look at the genotype-phenotype characteristics of BrS in our local patients.

**Methods:** Probands with Type 1 ECG (spontaneous or drug-induced) were included. Probands with type 2 or 3 ECGs had provocative testing with up to 400mg of oral flecainide. For genetic testing, 1 ml of saliva was collected via self-collection kit (Oragene-DNA:OG-500) after fasting for 30 minutes. Informed consents were obtained. All salivary specimens were sent to National Heart Centre, Singapore for genetic sequencing.

**Results:** 16 probands having BrS were recruited for genetic study between October 2014 and April 2015 (mean age: 44.81 +/- 14.18 years, 57% males). 8 probands (50%; 5 males) were genotype positive for pathogenic variants. 3 had variants in genes associated with BrS (SCN5A n=1, CACNA1c n=2). 4 had variants in MYH17, DSC2, MYBPC3 and MYH7 respectively. 1 had MYH6 and HFE. 1 proband (Chinese; male) had a novel SCN5A variant (DNA coding c.5103G>C; variant p.M1701I; {missense}) and MYL2. He had recurrent palpitations, spontaneous type I ECG and reproducibly inducible ventricular fibrillation (VF) leading to primary prevention implantable cardioverter defibrillator (ICD) implant aged 33 years. 6 years later, he had inappropriate shocks for sinus tachycardia due to partial fracture of the right ventricular shocking lead which was extracted and replaced. 2 apparently unrelated Malay probands had the same CACNA1C variant (DNA coding c.5731G>C; variant p.G1911R; {missense}). This variant had been associated with increased arrhythmogenesis and sudden unexplained infant death. The male had syncope, family history of premature sudden death, fever-induced type I ECG and reproducibly inducible VF aged 19 years. An ICD was recommended but patient did not proceed due to financial constraints. The female had a fever-induced type I ECG, was asymptomatic, and had a negative VT stimulation aged 58 years but has a son who had an incidental spontaneous type 1 ECG picked up aged 40yr. At follow-up, all are alive.

Conclusions: In our small cohort, variants in genes associated with BrS were observed in 19% of our patients. Given the low genetic yield for SCN5A (6%), it was unclear whether genetic screening should be offered to family members.

## 6. Usefulness of Left atrial strain by speckle tracking Echo the diagnosis of diastolic dysfunction

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### Introduction

The current guidelines to diagnose diastolic dysfunction is based on 4 variables namely, Mitral e prime, Mitral E/e ratio, Tricuspid regurgitant gradient and Left atrial size. Of the 4 variables, 3 are normal then it is considered as normal. If 3 or abnormal then diastolic dysfunction is diagnosed. If only 2 are present it is classified as indeterminate. Our aim is to look at the Left atrial strain to the whole group and see whether the indeterminate group can be categorized properly.

### METHODS

We studied 54 patients attending our Echo lab with normal ejection fraction of 50% or more. Those with structural heart disease were excluded. We collected data on the following 4 variables.

**Left atrial volume:** LA volume was calculated using the modified Simpsons rule, from the apical 4 chamber and 2 chamber view. Measurements were taken at end-systole, defined as the frame immediately preceding the mitral valve opening and the values are calculated indexed to the body surface area.

**Mitral E/e ratio:** This was measured using the pulsed and tissue Doppler at the septal level.

**Tricuspid Regurgitant velocity:** Apical 4 chamber view was optimized and using the color Doppler directed CW doppler the gradient was measured.

**Mitral e':** after getting a 4 chamber view the sample volume was placed at the septal level close to the mitral annulus and the velocity was measured.

**Speckle Tracking Echo:** In the apical 4 chamber view, we used the velocity vector imaging software of Siemens Medical solutions, Mountain View, Calif. The endocardium of the Left atrial wall was manually traced. The borders were adjusted as needed. In the mid septal wall and mid lateral wall we measured the strain and strain rate curves. The sample volume was placed 1 to 2 cm proximal to mitral annulus avoiding the fossa ovalis. We used a cut off value of less than – 23 as abnormal.

### Results

Of the 54 patients, 41 were assessed as Normal, 7 as indeterminate and 6 as diastolic dysfunction. When we applied the criteria for LA strain we were able to categorize 5 of the 7 as diastolic dysfunction. The results are given below:

Variable	Mean + Standard deviation
LV ejection fraction %	63.72 ± 6
E/e ratio	10.02 ± 4.4
Tricuspid Regurgitant velocity( m/sec)	2.49 ± 0.9
LA volume index -2 D echo ( ml)	32.66 ± 15
LA global strain	- 43.88 ± 22.4

### Conclusions

Speckle tracking echo can be done easily as an additional tool to assess the diastolic dysfunction. Patients in whom we have difficulty in categorizing for diastolic dysfunction this can be added to the

regular 4 variables. This will help to identify patients with diastolic dysfunction and this has a bearing in the management of patients with dyspnea and atrial fibrillation.

## **7. Aortic Valve Regurgitation due to Avulsion of Aortic Valve**

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Acute aortic regurgitation due to avulsion of aortic valve is generally uncommon. However, if it does occur, it is due to a blunt trauma to the chest. Other causes also include infective endocarditis, type A aortic dissection, annuloaortic ectasia, rheumatic fever, syphilis, bicuspid aortic valve, iatrogenic (secondary to a procedure for example aortic balloon valvotomy or failed surgical valve repair). Spontaneous or non-traumatic causes of avulsion of aortic valves are very rare. Transthoracic or transoesophageal echocardiograms do help in the diagnosis of aortic regurgitation and subsequently demonstrating avulsion of the aortic valve.

The case described below is a case of aortic regurgitation secondary to avulsion of aortic valve which is rarely seen in this local centre i.e. Raja Isteri Pengrian Anak Saleha Hospital (RIPASH).

A 47 year old British male with no known past medical history was brought to hospital following a multiple high impact injuries during a parasailing accident. Injuries included bilateral lung contusion with left sided pneumothorax, multiple left sided rib fractures and right acetabular fracture. Unfortunately, patient was haemodynamically unstable and thus, required intubation, ventilation and inotropic support in the intensive care unit (ICU).

Troponin T blood test was noted to be high at 569 and this led to the involvement of cardiology team. Transthoracic echocardiogram (TTE) was subsequently done which showed a significant aortic regurgitation. In addition to haemodynamic instability, transoesophageal echocardiogram (TEE) was proceeded in order to better visualise the aortic valves.

TEE showed the non-coronary cusp of the aortic valve was prolapsed and attached to a flap from the ascending aorta. The aortic valve was noted to be leaking and evidently causing severe aortic regurgitation. The regurgitation jet itself was impinging against the anterior mitral valve leaflet. In view of the severity of the regurgitation, patient was repatriated to Singapore for urgent aortic valve replacement.

The cause of the avulsion of the aortic valve was still uncertain in this case. However, it was most likely due to the high impact trauma to the chest.

Aortic regurgitation due to avulsion of aortic valve is uncommon especially here in the local centre. With available access to TTE or TEE, diagnosing the avulsion of aortic valves is relatively easy. Challenges still remained in this case as the true pathology remained uncertain; either trauma or spontaneous.

## **8. A Case of Hypoalbuminaemia Leading to Diagnosis of Idiopathic Constrictive Pericarditis.**

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Constrictive pericarditis is a relatively uncommon cause of diastolic heart failure. It occurs following a chronic inflammation to the pericardium causing thickening and inelasticity of the pericardium. This caused a restriction to the normal diastolic filling of the heart.

The prevalence itself is yet to be defined. However, it was reported that about 0.2-0.4% of cases were due to post cardiac surgical intervention and less than 1% is idiopathic in the developed countries. Meanwhile, in developing countries, tuberculous pericarditis is more common.

Many have reported challenges in diagnosing the disease clinically. The following case is one of such challenging cases admitted in Raja Isteri Pengiran Anak Isteri Saleha Hospital (RIPASH).

A 27 years old female was admitted with features of fluid overload. Examination revealed presence of hepatomegaly and preliminary blood tests showed a significant hypoalbuminaemia. At that time, working diagnosis included underlying gastrointestinal disease or tuberculosis. However, these differentials were excluded following normal endoscopies, negative immunology tests, negative sputum (acid fast bacilli) and quantiferon tests.

Computed tomography (CT) thorax, abdomen and pelvis were done. It showed dilated right atrium and hepatic vein distension with a resultant heterogenous enhancement of the liver. Hepatomegaly was present with slight nodularity which was suggestive of cardiac cirrhosis.

Subsequently, transthoracic echocardiogram (TTE) was done which showed markedly dilated left and right atria dilatations with thickened pericardium. There were also moderate mitral and tricuspid regurgitations present.

Following this, further investigations were focused on cardiac pathology. Magnetic resonance imaging (MRI) of the cardiac again confirmed left and right atria dilatation with thickened pericardium. Coronary angiogram was negative for any coronary disease. Right heart study with simultaneous right and left ventricles tracing was also done and showed evidence of ventricular interdependence during respiration. This confirmed the presence of constrictive pericarditis.

Patient then underwent open pericardiectomy. Perioperatively, there was a thick pericardium with some areas of calcification especially towards the atrioventricular groove and evidently, causing restriction in the heart contractility. Investigation of pericardial sample was negative for tuberculosis and only showed mixed inflammation and fibrosis.

Final diagnosis was narrowed down to idiopathic constrictive pericarditis as no pathological causes identified. Postoperatively, patient was well and has been asymptomatic since.

In conclusion, constrictive pericarditis remains to be a challenging clinical diagnosis. It can present with non-specific symptoms such as in this case. However, this disease is curable and can lead to marked improvement in symptoms and quality of life.

## **9. Abstract Title: Prevalance And Predictors Of Electrocardiogram Abnormalities Among Athletes In Brunei**

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Background: Existing evidences predominantly in Western countries have demonstrated that athletes' hearts undergo structural, physiological and electrical changes that leads to abnormal ECG findings, which are said to be training-related. Athletes with non-training-related ECG abnormalities run the risk of developing sudden cardiac death. The lack of studies on Asian population on this issue warrants further exploration.

Aim: To estimate the prevalence and predictive factors contributing to ECG abnormalities among athletes in Brunei.

Methods: Descriptive cross-sectional study conducted on athletes in Brunei where ECG readings and essential information was obtained.

Results: 100 athletes (Median age  $25.2 \pm 9.0$  years) in 10 sporting disciplines participated in the study. The prevalence of abnormal ECG was 52.0% (95% CI:42.0%,62.0%), of which prevalence of training-related changes was 49.0% (95% CI: 39.0%, 59.0%) and non-training related was 3.0% (95%CI: 0.4%, 6.4%). Athletes with higher BMI were 3.30 times (95%CI: 1.47,9.58) significantly more likely to report abnormal ECG readings. Athletes who were less than 25 years old (OR=0.25, 95%CI:0.07,0.81) and trained with low dynamic intensity (OR=0.33, 95%CI:0.12,0.93) were significantly less likely to have ECG abnormalities compared to those more than 25 years old and doing moderate to high dynamic intensity sports, respectively.

Conclusion: Training-related ECG abnormalities are more prevalent among athletes in Brunei, which are due to normal physiological cardiac changes rather than any underlying cardiac disease. There may be a lower need for ECG to be included as a routine screening test for all athletes in Brunei particularly strength athletes, younger athletes (<25 years old) and athletes of lower BMI.

#### **10. Atrial fibrillation with Wolff-Parkinson White Syndrome, a case report.**

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Wolff-Parkinson-White (WPW) syndrome that presents with tachy-arrhythmias such as atrial fibrillation may be difficult to recognise. However, early recognition is crucial so that the appropriate management can be given for them to avoid fatal tachy-arrhythmias. We present a case of a 34 year old man who presented with WPW and atrial fibrillation. With no known prior illness, he had presented with giddiness and near syncope. He was found to have significant tachycardia with abnormal ECG findings. He was treated with IV amiodarone infusion initially before undergoing DC Cardioversion. Patient was subsequently transferred to the tertiary cardiac centre where a radiofrequency ablation of the accessory pathway was successfully done. This case illustrates importance of recognising Wolff-Parkinson-White ECG findings. With the understanding of the accessory conduction pathways and different actions of anti-arrhythmics, we debate the use of IV amiodarone with unavailability of the recommended anti-arrhythmics (ibutilide and procainamide) and potential implications.

#### **11. Gastrointestinal Bleeding and Antiplatelet/Anticoagulant: Data from Raja Isteri Pengiran Anak Saleha Hospital**

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##### Introduction

Aspirin, alone or combined with other antiplatelet/anticoagulant agents, is increasingly prescribed for cardiovascular prevention. However, the cardiovascular benefits should be evaluated together with the gastrointestinal bleeding risks.

##### Background

Antiplatelet/anticoagulant is associated with upper and lower gastrointestinal bleeding (UGIB/LGIB). The aim of this study is (1)to identify risk factors for gastrointestinal bleeding (age, comorbidities, concomitant use of antiplatelet(aspirin, clopidogrel, dual antiplatelet therapy (DAPT)), anticoagulant, non-steroidal anti-inflammatory drugs(NSAIDs), malignancy; and (2) to determine relationship

between each antiplatelet/anticoagulant, risk factors with the need for endoscopic intervention and blood transfusion.

#### Methods

All patients, including those on antiplatelet and anticoagulant, admitted for UGIB/LGIB to RIPAS Hospital from July 2017 and to June 2018 were collected.

#### Results

Of 166 patients with median age of 63.5 years old (range: 21-93), 102(61.4%) were male, admitted for acute gastrointestinal (GI) bleeding, 68 patients(40.9%) was either on aspirin(12.7%), clopidogrel(12%), DAPT(3.6%), or anticoagulant(12.7%). Of those 68 patients, 21(30.8%) patients is on antiplatelet either aspirin or clopidogrel for primary prevention.

Clopidogrel and chronic kidney disease (CKD) were associated with increased risk of significant haemoglobin drop with the need of blood transfusion with OR: 3.73 (95%CI, 0.47-29.26, p=0.036); OR: 2.80 (95%CI, 0.91-8.65, p=0.04), respectively. CKD, anticoagulant and hypertension were associated with an increase need of endoscopic intervention with OR:2.088 (95%CI, 1.29-3.39,p=0.001); OR:1.97 (95%CI,0.90-4.31); OR:1.65 (95%CI,1.19-2.29) respectively.

#### Conclusion

Antiplatelets and anticoagulants have a large role in secondary prevention of cardiovascular events. Primary prevention is widely practiced and patients need to be assessed for their cardiovascular risk using available validated assessment tools to curb the rate of gastrointestinal bleeding. Our study showed that patients on clopidogrel or underlying CKD are at higher risk for bleeding. Further studies in particular prospective studies are required to assess these findings.

#### 12. Title: **Improving the quality of clinical documentation in STEMI transfer in RIPAS Hospital Emergency Department**

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**Introduction:** Creditable and timely clinical documentation during inter-hospital transfer for ST-Elevation Myocardial Infarction (STEMI) is an essential component in patient care. Good quality documentations not only validating the care that was provided but it also facilitate sharing of relevant clinical information between healthcare providers in order to make evidence-based healthcare decisions. STEMI management and transfer guideline has been introduce in Raja Isteri Pengiran Anak Saleha (RIPAS) Hospital Emergency Department and “Emergency AMI” electronic medical record (EMR) in BruHlms is advocated to be utilized to improve workflows process and increase transfer efficiency. This audit cycle aims to monitor and improve the quality clinical documentation during STEMI inter-hospital transfer.

**Methods:** We designed and implemented a practical clinical audit process as a way of measuring the quality of the transfer documentation from “Emergency AMI” clinical record from January 2017 to August 2018. There are four main domains of clinical documentation that is monitored which are 1) Medical History, 2) Examination, 3) Medication and 4) Timing. Initial baseline audit is calculated and the results were presented during the monthly meeting to improve awareness amongst physicians then re-audit for quality monitoring.

**Results:** There were improvements in all documentation domains. The “medical history” domains increase from 84% to 98%, “examination” domains increased from 93% to 99%, “medication” domains increased from 74% to 96% and “timing” domain increased from 68 % to 76%. The total

documentation completion score of the monthly audit reports increased from 80% (pre-intervention) to 92% (post-intervention).

**Conclusion:** Through the introduction of auditing tool and the effort of giving monthly feedback to the Emergency Department, it has been shown that the quality of medical documentation not just improved but can be consistently monitored and regularly shared amongst the healthcare team. With better clinical documentation during inter-hospital STEMI transfer, it can expectantly facilitate the transfer process more efficiently and ultimately improves patient care.