Identification of Metabolite Changes in Plasma Following Ticagrelor Cessation in Acute Coronary Syndrome Patients Using Metabolomics

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Objective: Stopping dual antiplatelet therapy (DAPT) has been shown to increase the risk of adverse event following acute coronary syndrome (ACS).

Materials & Methods: We used liquid chromatography-mass spectrometry to compare the serum metabolite profile of patients with ACS while on ticagrelor (within one month before DAPT ended) and after cessation (between 7 to 30 days after ticagrelor ended). Metabolite changes between before and after cessation were determined using paired t-tests with a p-value of <0.05 considered significant.

Results: The metabolomics analysis cohort included 7 patients [mean age 66.0 (SD 7.2) years], 5 ST-elevation myocardial infarction (STEMI) and 2 non-STEMI. All patients were treated with aspirin 75mg daily and combination with ticagrelor 90mg twice daily. Mean total duration (SD) of DAPT therapy following ACS was 167 (32.5) days. 311 putative metabolites were identified. We found 16 statistically significant metabolites of interest, of which 7 metabolites were from lipid pathway, 1 from carbohydrate metabolism and one from nucleotide metabolism. Notably, after stopping ticagrelor, adenosine pathway was upregulated to 2.6 fold (uncorrected p = 0.028).

Conclusions: In this preliminary study, we used an untargeted metabolomics approach to assess changes in metabolites after cessation of ticagrelor. Multiple metabolite changes were observed, including an up-regulation of the adenosine pathway. The clinical significance of these changes remains to be determined.

Lactate as a Prognostic Indicator Among Acutely Ill Cardiac Patients

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Background: Hyperlactatemia had been shown to be associated with poor outcome in patients with critical conditions such as sepsis and trauma.

Objective: The study aims to document lactate levels on admission to Coronary Care Unit (CCU) and correlate with clinical outcomes.

Materials & Methods: This was a prospective, observational study of data collected from CCU Registry in a tertiary cardiac centre over 6 months. Lactate levels were documented from the first arterial blood gas taken on admission to CCU. Correlations were made with inpatient mortality, left ventricular ejection fraction (LVEF), requirement for ventilator and inotropic support; and duration of hospital stay.

Results: 26 out of 90 patients entered into the registry had data on lactate measurements. 50% of these patients had a high lactate level of more than 3.2 mmol/l. The most common diagnosis at admission for this group was decompensated heart failure (69.2%) followed by NSTEMI (38.5%). Inpatient mortality for this group of patient was higher at 38.5% compared with 30.8% in those with lactate level of less than 3.2 mmol/l (p = 0.025). These patients also have lower LVEF (33% vs 40%, p = 0.065), higher requirement for mechanical ventilation (85% vs 54%) and inotropic support (61.5% vs 46.2%, p = 0.001) with longer hospital stay (22.5 days vs 12.2 days).

Conclusions: This preliminary data shows that there is a trend for poorer outcome in patients with higher lactate level. However, further study with larger number is needed to ascertain this. As lactate measurement can be obtained rapidly at point-of-care, knowing its prognostic implication would allow early risk stratification, proper monitoring and more tailored therapy.


Comparative Treatment Cost, Effectiveness and Safety of Dabigatran, Rivaroxaban and Warfarin in Atrial Fibrillation (AF) Patients: A Descriptive Study from Penang General Hospital (PGH)

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Background: Warfarin has been the predominant treatment option for stroke prevention in AF patients in PGH. However, it requires frequent monitoring due to its narrow therapeutic index. Newer oral anticoagulants, Dabigatran and Rivaroxaban, were introduced into the National Drug Formulary since 2009. They were found to be as effective as warfarin with lesser monitoring requirements. Nevertheless, they are more expensive.

Objective: To compare cost, effectiveness and safety of Dabigatran, Rivaroxaban and Warfarin in AF patients from Cardiology Clinic, PGH.

Materials Methods: This is a one-year retrospective study. Treatment costs include medications, INR point-of-care testing, personnel, and facilities. Effectiveness outcome was stroke. Safety outcomes were major and minor bleeding. Data was collected from clinic case notes, pharmacy inventory and finance department using a pre-design data collection form.

Results: A total of 224 patients were included in this study (Warfarin, n = 122; Dabigatran, n = 63; Rivaroxaban, n = 39). Total treatment cost per patient annually for Warfarin, Dabigatran and Rivaroxaban were MYR 651.11, MYR 2944.83 and MYR 2893.73, respectively. Personnel cost (MYR354.17) and INR point-of-care testing cost (MYR152.49) were the two largest contributing costs in warfarin treatment annually. Warfarin patients had an average of 9.8 outpatient clinic visits compared to 3.19 outpatient clinic visits in NOACs patients. However, high drug acquisition cost for Dabigatran (MYR2828.75) and Rivaroxaban (MYR2777.65) led to high treatment cost in NOACs as compared to Warfarin (RM142.00).

During the study period, 1 incident of ischemic stroke was observed in patients taking Warfarin, none from the NOACs group. No bleeding events were reported in Rivaroxaban group while 1 patient (1.59%) on Dabigatran experienced minor bleeding. A higher percentage of bleeding events (4.92%) were observed in patients on Warfarin, 3 patients with major bleed and 3 with minor bleed.

Conclusions: The treatment costs for both Dabigatran and Rivaroxaban were 4 times higher than Warfarin. Patients taking Warfarin had 3-fold higher bleeding events compared to Dabigatran. This study...