Editorial

Acute Coronary Syndrome: from Epidemiology to Treatment

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The term "acute coronary syndrome" (ACS) was introduced a decade ago to describe a spectrum of conditions resulting in acute myocardial ischaemia. It comprises unstable angina (UA), non-ST-segment elevation myocardial infarction (NSTEMI) and ST-segment myocardial infarction (STEMI). ACS is often the first presentation of coronary artery disease (CAD), the leading cause of mortality and morbidity in many parts of the world, including Singapore. Patients presenting with ACS frequently present first to primary healthcare physicians, who then routinely refer them directly to Emergency Departments. Remarkable achievements in understanding ACS, and consequently to the diagnosis and treatment of this condition have been made over the past 10 years.

The underlying cause of ACS is a sudden rupture of a pre-existing atherosclerotic plaque. Unlike stable and often flow limiting plaques that present with typical effort angina, the plaques that rupture (coined vulnerable plaques) are often non-occlusive and hence un-detectable by conventional stress testing. Imaging by modalities such as CT angiography or routine angiography are unable to detect with any certainty those plaques prone to rupture, therefore explaining why ACS is often the first presentation of patients to physicians. Once plaque rupture takes place, this is immediately followed by thrombosis around the plaque. If the thrombus is occlusive, this leads to a classic STEMI. However, if the thrombus is only partially occlusive, patients will present with symptoms of UA and/or a NSTEMI. Whatever the presentation, there is now understanding that unless the diagnosis is quickly made and flow restored, usually by percutaneous coronary intervention (PCI), there would be as a consequence cardiac muscle damage and loss of effective cardiac output, leading to cardiac failure.

In this issue of Annals, we published 16 excellently prepared papers on ACS. It is particularly encouraging that we received papers not only from cardiologists, but also from psychiatrists and rheumatologists, as there are numeourous other medical conditions related to ACS. Likewise, apart from papers originated from Singapore, there are contributions from Hong Kong and the United Kingdom.

The Framingham risk score has been used to predict the 10-year risk of developing coronary heart disease in people with no history of cardiovascular disease. Although validated, Lee et al, using data from over 1000 local patients, found that Framingham risk score could have inadequately predicted the risk among young patients presenting with myocardial infarction. Epidemiological studies indicate that psychosocial factors are associated with the acute cardiac events. Ho review the importance of psychoneuroimmunology studies in understanding the role of acute and chronic psychological stressors on the immune system and on the development of ACS. A panic attack often mimics ACS, and the 2 conditions are indistinguishable without appropriate investigations. Soh and Lee review the literature and they suggest that panic disorder is actually an independent risk factor for ACS.

The rupture and erosion of vulnerable coronary artery plaque contribute to the development of ACS. Koh and Chia elegantly review current invasive and non-invasive modalities to image coronary plaque, and describe how these emerging techniques can improve our understanding of the pathophysiology of ACS. Apart from symptoms and electrocardiographic changes, the evaluation of biomarkers is an important component in the diagnosis of ACS. Moe and Wong discuss in the newly developing technologies for novel biomarkers discovery, and the importance of point-of-care testing for rapid diagnosis and hence management of patients presenting with ACS.

Risk stratification is critical in managing patients with ACS. Risk prediction models identify high-risk patients who would benefit from early revascularisation therapy. Chin et al discuss the process of developing and validating a risk prediction model, and the more commonly used models in clinical practice, such as the TIMI, PURSUIT and GRACE risk models.

The timely reperfusion of the occluded coronary artery is of the utmost importance in the management of ACS. Although there are ample data showing the superiority of primary PCI over fibrinolytic therapy in the treatment of STEMI, whether this holds true for patients with normal versus impaired renal function is uncertain. Chan et al

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report that primary PCI was associated with improved 30-day survival in patients with normal renal function but not in those with impaired renal function. Aggressive antiplatelet therapy as an adjunct to primary PCI is the standard of care for acute myocardial infarction. Tan and Guo present a very detailed review on the role of aspirin and thienopyridines in the management of ACS. Although PCI can achieve high rates of epicardial artery patency, a significant minority of patients experience suboptimal microvascular perfusion, which affects long-term prognosis. Chiam and Liew review the merits and limitations of a number of the pharmacologic agents and mechanical devices used to improve microvascular perfusion at contemporary catheterisation laboratories. Complete atrioventricular block occurs in up to 15% of patients with acute inferior myocardial infarction. The associated angiographic findings and prognosis of this arrhythmia remain unclear. Jim MH et al report that complete atrioventricular block in acute inferior myocardial infarction is mostly caused by dominant right coronary artery occlusion, and is associated with advanced age, larger infarct size and high in-hospital mortality.

Previous studies suggested that there might be gender-related differences in response to early invasive strategy among patients with ACS. Lee et al report that women benefit from an invasive approach just as much as men, despite their advanced age, with similar rates of mortality and recurrent infarction. In a review on the same topic of effect gender in ACS management, Jibran et al report there remains evidence for continued gender disparity in contemporary practice; despite evidence for efficacy in ACS patients, women receive a notably lower use of glycoprotein IIb/IIIa inhibitors and are less likely to receive a beta blocker. Women are also significantly more likely to have femoral access site complications.

Acute myocardial infarction during pregnancy is an uncommon condition. Nonetheless, it represents an imminent threat to both the patient and fetus when it occurs. In a review, Poh and Lee present a comprehensive overview on myocardial infarction in pregnancy.

Patients who survive the acute phase of myocardial infarction remain at risk of recurrent cardiac events, including sudden death. Liew and Chiam review the role of various cardiac investigations including signal-averaged electrocardiopgraphy, T-wave alternans, heart rate variability, heart rate turbulence, echocardiography, cardiac magnetic resonance, as well as invasive electrophysiological testing in predicting the risk of future adverse cardiac event.

In this theme issue, we also have 2 interesting case report/series. Jim et al describe primary PCI on anomalous right coronary arteries. Ho et al report a small series of patients with reversible complete heart block complicating anterior myocardial infarction.

The Editors wish to thank all the contributors for their insight into this common condition and hope that readers of the journal will enjoy the variety and depth of discussion in the articles. The issue is a timely reminder that ACS has significant mortality and morbidity and efforts should be made to "open" blocked arteries quickly, stabilise the unstable plaque by various mechanical and/or pharmacological means, and that time wasted in making the diagnosis is muscle loss and hence detrimental to patient outcome.