Halftime review

Risk stratification, short-term risk factors and treatment optimization in patients with myocardial infarction

Moman Aladdin Mohammad
Department of Clinical Sciences, Cardiology

Main Supervisor:
David Erlinge, Prof.

Reviewers:
Patrik Tydén, MD, PhD
Ulf Thilén, MD, PhD

Co-supervisors:
Sasha Koul, MD, PhD
Thomas Engström, Prof.

Department of Cardiology, Lund University, Lund
5th October 2018
Abstract

Background

Myocardial Infarction (MI) is a multifactorial disease caused by rupture of an atherosclerotic resulting in ischemia and ultimately, myocardial cell death. External, short-term risk factors are believed to modulate the onset of MI by eliciting the rupture of atherosclerotic plaque and infarct size (IS), reflected by the degree of cardiac markers of injury released to blood is one of the major determinants of outcome. Beta-blockers administered intravenously (IV) in the acute phase of ST-elevation MI (STEMI) have been shown to reduce IS with limited clinical data in the era of mechanical reperfusion.

Objectives and Method

We aimed to 1) investigate the role of IV beta-blockers in patients with ST-elevation MI treated with up to date therapy using the nationwide SWEDEHEART registry; 2) study the associations of weather and risk of MI by linking weather data from Swedish Meteorological and Hydrological Institute to the SWEDEHEART registry; 3) examine the associations of markers of myocardial damage to cardiac magnetic resonance imaging assessed IS and ejection fraction (EF) using data from a randomized clinical trial.

Results

In paper I, we saw a steady decline and a high variability in the use of IV beta-blockers among different centres and that the use of IV beta-blocker was associated with higher short-term mortality, lower EF at discharge, as well as a higher risk of in-
hospital cardiogenic shock. In paper II we observed a higher incidence of MI with lower air temperature, lower atmospheric air pressure, higher wind velocity and shorter sunshine duration with the most pronounced association was observed for air temperature. In paper III we saw a strong correlation of hs-cTnT to IS and EF at 6 month. Furthermore, hs-cTnT was highly predictive of EF≤40% at 6 months.

**Conclusion**

We conclude that 1) routine use of IV beta-blocker in patients with STEMI is questionable and should be reserved to carefully selected patients until more evidence is available; 2) weather and particularly air temperature may modulate the onset of MI; 3) hs-cTnT is an accurate predictor of outcome in first-time STEMI patients.

**Articles:**


Objectives of remaining projects in my thesis:

- The objectives of paper IV were to study the associations of national holidays, major sport events and circadian rhythm aspects as triggers of myocardial infarction. This paper is currently under peer review.

- The objective in paper V was to validate the results of hs-cTnT in a larger cohort. Manuscript.

- The objectives of paper VI are to predict 1-year all-cause mortality and heart failure admission after MI using artificial intelligence. This study is in the final phase as we are currently awaiting the final dataset for external validation.