Brief report

Changing landscape of STEMI care in Sri Lanka

Ranasinghe, G.[1,2] Vithanage, T.D. P [1] Beane, A [3] Mendis, S.A.E.S [1] Fernando, N [1] Amarasekera, H. S. U[1] Fernando, M. [1] Rajakanthan, K.[4] Ponnamperuma, C[4] Hassan, M. H. M. [2] Haniffa, R[3]

1 Institute of Cardiology, National Hospital of Sri Lanka
2 Sri Lanka STEMI Forum
3 Network for Improving Critical Care Systems and Training (NICST)

Abstract

Current evidence based recommendations emphasize the importance of timely reperfusion therapy, preferably by primary percutaneous coronary intervention (primary PCI), in the management of STEMI. In Sri Lanka, where primary PCI services are in its initial stages of being established, the level of adherence to guideline recommended practices is not well elucidated. A multi-centre observational registry of patients with acute myocardial infarction was therefore envisaged and initiated by the Sri Lanka STEMI Forum in collaboration with the Network for Improving Critical Care Systems and Training (NICST). The objectives of the registry are to describe the demographic, clinical, and biological characteristics of patients with acute myocardial infarction admitted to a representative setting of cardiology centres (with and without PCI facilities) in Sri Lanka, to assess management patterns and in particular the current use of reperfusion therapies and to evaluate how recommendations are adopted in current practice and identify factors that may contribute to inadequate adherence to evidence-based guidelines. All patients with acute myocardial infarction presenting to the Cardiology Departments of the National Hospital of Sri Lanka and Colombo South Teaching Hospital from March 2017 onwards are enrolled in the ongoing registry. Data is collected using a mobile, real time, electronic data collection platform co-designed by senior cardiologists, researchers and developers of the Sri Lanka STEMI Forum and NICST. To date, the registry has over 1400 episodes of care including route to admission, risk factors, severity of illness of admission, interventions and quality of recovery up to 30 days following PCI. The registry is planned for expansion to include acute myocardial infarction patients from other hospitals. It is hoped that the data obtained and the conclusions drawn from such an expanded registry would help streamline the implementation of the 'wagon wheel model' of STEMI care proposed by the Sri Lanka STEMI Forum and Sri Lanka Heart Association.

Introduction

Timely reperfusion therapy is the cornerstone in the management of ST segment elevation myocardial infarction (STEMI). Both European and American guidelines recommend primary percutaneous coronary intervention (PCI) as the preferred method of treatment for STEMI when the anticipated PCI related time delay is less than 120 minutes from the time of STEMI diagnosis[1,2]. In situations where these timelines cannot be adhered to, fibrinolysis is the recommended reperfusion strategy and should be administered within 10 minutes of STEMI diagnosis [1,2].

Whilst there has been significant progress in adherence to STEMI care recommendations in High Income Countries (HICs) [3], in Low-Middle Income Countries (LMICs), where heart disease is a rising cause of mortality[4], adherence remains limited[5,6]. In Sri Lanka, an LMIC, where primary PCI services are in the initial stages of being established, the 'wagon-wheel model for STEMI care', a protocol specifying the reperfusion strategy based on the geographical location of a patient's first medical contact and the regional availability of PCI services, has been proposed by the Sri Lanka STEMI Forum as a feasible approach to achieve better adherence to guideline recommendations[7].

Given the importance of improving the existing system to ensure smooth implementation of such a program, identifying gaps and inadequacies in current practices is essential at the outset.
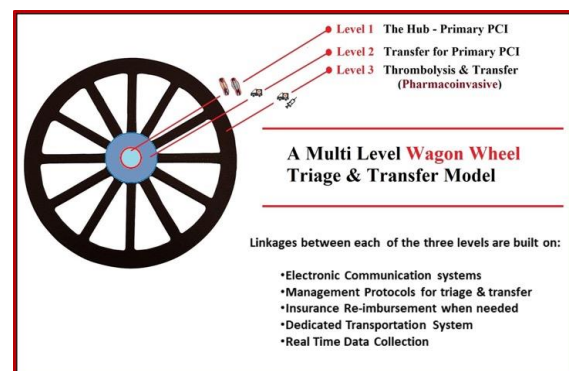
Figure 1 –A schematic representation of the 'wagon wheel' model

The challenge

Data regarding current practices of STEMI care in Sri Lanka is limited with only small studies in single centre settings. Some of them were conducted in settings where the predominant mode of reperfusion offered to STEMI patients was fibrinolysis[8,9]. A more recent study, done in a PCI capable setting, was relatively small in terms of patient numbers[10].
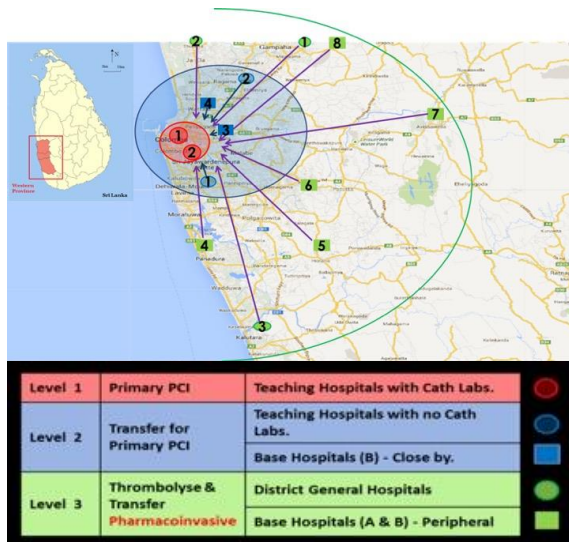
Figure 2 – The 'wagon wheel' model in practice

Data from such studies may not reflect the actual picture of STEMI care in the country, where multiple reasons such as inequalities in availability and access to PCI services and little or absent pre-hospital care services means adherence to guidelines are likely to be inadequate. Furthermore, existing published data may be insufficiently powered to make broader conclusions or provide the longitudinal data necessary to identify priorities in or evaluate efforts to improve services.

Patient registries, such as the ones that are in place in HICs[11,12], are therefore of paramount importance in providing information essential for identifying and bridging gaps and benchmarking services both at facility level and nationally. However, in a setting where obtaining local and national level data is hampered by the lack of centrally networked electronic patient records and the lack of a uniform system of recording patient details on the existing paper based records, setting up large patient registries remain a challenging task.

We describe our progress in establishing a systematic, live registry of STEMI patients in Sri Lanka. Pioneered at the only 24 hour primary PCI centre in the country, the Institute of Cardiology of the National Hospital of Sri Lanka and the non-PCI capable Colombo South Teaching Hospital, the registry was conceptualized and developed by the Sri Lanka STEMI Forum in collaboration with Network for Improving Critical Care Systems and Training (NICST).

Aims and objectives

The primary objectives of this multi-centre, observational registry are to

- describe the demographic, clinical, and biological characteristics of patients with STEMI admitted to a representative setting of cardiology centres (with and without PCI facilities) in Sri Lanka
- assess management patterns and in particular the current use of reperfusion therapies
- evaluate how recommendations of most recent STEMI guidelines are adopted in clinical practice and how their application impacts patients' outcomes
- identify factors that may contribute to inadequate adherence to evidence-based guidelines
- evaluate in-hospital and 30 day patient outcomes

Conclusions made by achieving these objectives will provide a much needed evidence base to develop a streamlined STEMI care system across the country, specifically with regard to the diagnostic and admission process and treatment pathways such as the proposed 'wagon-wheel model'.

Design and methodology

The electronic real time mobile registry is adapted from the established NICST methodology [13,14]. This android compatible application, with offline functionality, was co-designed by senior cardiologists, researchers and developers of the Sri Lanka STEMI forum and NICST. The platform enables real time capture of clinical, demographic and outcome information.

The information can be viewed in the application to support clinical decision making, or through desktop dashboards enabling review and evaluation of aggregate information. The collaboration meet regularly to review the registry output and refine the functionality of the registry. All information is securely stored in the Ministry of Health Sri Lanka servers, in keeping with Information and Communication Technology Agency (ICTA) Sri Lanka guidelines.

Brief report

Funding

Output

The registry launched in 2017, now has over 1400 episodes of care including route to admission, risk factors, severity of illness on admission, interventions and quality of recovery up to 30 days following PCI. The registry has been extended to two sites in Sri Lanka. Work is underway to evaluate quality of recovery for patients undergoing PCI and to look at inequalities in access to tertiary services and their impact on morbidity and mortality.

Future

The information leveraged through the registry will be used to improve the only existing primary PCI program in the country and to implement new dedicated STEMI care programs in other parts of the country. It is hoped that this would help streamline the implementation of the 'wagon wheel model' proposed by the Sri Lanka STEMI Forum and Sri Lanka Heart Association for the purpose of triaging and transferring STEMI patients within regional networks of hospitals.

The availability of a dedicated electronic database where data could be entered real time via tablets or smartphones harnesses existing resources and the growing availability of android technology and 3G connectivity in the region. As such, this technology can be rapidly integrated into electronic health records which may be introduced nationally in the near future and may provide a template for management of other acute and non-communicable disease pathways both in Sri Lanka and in South Asia.

References

1. Ibanez, B., et al., *2017 ESC Guidelines for the management of acute myocardial infarction in patients presenting with ST-segment elevationThe Task Force for the management of acute myocardial infarction in patients presenting with ST-segment elevation of the European Society of Cardiology (ESC).* European Heart Journal, 2018. **39**(2): p. 119-177.

2. O'Gara, P.T., et al., *2013 ACCF/AHA guideline for the management of ST-elevation myocardial infarction: a report of the American College of Cardiology Foundation/American Heart Association Task Force on Practice Guidelines.* Journal of the American Colleege of Cardiology, 2013. **61**(4): p. e78-140.

3. Bebb, O., et al., *Performance of hospitals according to the ESC ACCA quality indicators and 30-day mortality for acute myocardial infarction: national cohort study using the United Kingdom Myocardial Ischaemia National Audit Project (MINAP) register.* European Heart Journl, 2017. **38**(13): p. 974-982.

4. Roth, G.A., et al., *Global and regional patterns in cardiovascular mortality from 1990 to 2013.* Circulation, 2015. **132**(17): p. 1667-78.

5. Mohanan, P.P., et al., *Presentation, management, and outcomes of 25 748 acute coronary syndrome admissions in Kerala, India: results from the Kerala ACS Registry.* European Heart Journal, 2013. **34**(2): p. 121-9.

6. Dharma, S., et al., *Characteristics, treatment and in-hospital outcomes of patients with STEMI in a metropolitan area of a developing country: an initial report of the extended Jakarta Acute Coronary Syndrome registry.* BMJ Open, 2016. **6**(8): p. e012193.

7. Sri Lanka STEMI Forum, Sri Lanka Heart Association, *STEMI Management Guidelines.* Journal of the Ceylon College of Physicians, 2014. **45**(1 & 2 (Supplement)): p. S2-20.

8. Rajapakse, S., P.C. Rodrigo, and J. Selvachandran, *Management of acute coronary syndrome in a tertiary care general medical unit in Sri Lanka: how closely do we follow the guidelines?* Journal of Clinical Pharmacy and Therapeutics, 2010. **35**(4): p. 421-7.

9. Bandara, R., et al., *Management and outcomes of acute ST-segment-elevation myocardial infarction at a tertiary-care hospital in Sri Lanka: an observational study.* BMC Cardiovascular Disorders, 2015. **15**: p. 1.

10. Rahuman, M.B., et al., *Outcome of early coronary intervention for acute ST elevation myocardial infarction in a tertiary care cardiac centre in Sri Lanka.* Ceylon Medical Journal, 2016. **61**(1): p. 26-31.

11. Peterson, E.D., et al., *The NCDR ACTION Registry-GWTG: transforming contemporary acute myocardial infarction clinical care.* Heart, 2010. **96**(22): p. 1798-802.

12. Kalla, K., et al., *Implementation of guidelines improves the standard of care: the Viennese registry on reperfusion strategies in ST-elevation myocardial infarction (Vienna STEMI registry).* Circulation, 2006. **113**(20): p. 2398-405.

13. Beane, A., et al., *Surgical surveillance in resource-poor settings.* Lancet, 2018. **391**(10130): p. 1571.

14. Hashmi, M., et al., *Pakistan Registry of Intensive CarE - PRICE -Expanding a Lower-Middle Income, clinician-designed critical care registry in South Asia.* Journal of the Intensive Care Society, 2018. **Accepted for publication**.

Brief report