

THE STEMI INDIA CHARITABLE TRUST

Systems of care for heart-attack management

The STEMI India Charitable Trust (STEMI India) was established in 2012 by Dr Thomas Alexander and Dr Ajit Mullasari to set up an effective system of care for the management of ST-Elevation Myocardial Infarction (STEMI) in India.

Need for a system of care to treat STEMI

There is an urgent need to set up an efficient system of care for the management of heart attack.

- Ischaemic heart disease is the **leading cause of death** in India - 12% of all premature deaths are due to heart disease.
- India has the highest burden of cardiovascular disease in the world - over 60 million patients.
- **3 million** of these suffer from **ST-Elevation Myocardial Infarction (STEMI)**, the deadliest form of heart attack.
- A STEMI patient needs to be treated within 90 minutes of symptom onset (the “Golden Hour”). Every 30-minute delay thereafter results in a 50% loss of heart muscle.

Primary percutaneous coronary intervention (PCI), the treatment strategy of choice in high-income countries, is seldom used as the means for reperfusion in low- and middle-income countries (LMICs). Thrombolysis is the main mode for reperfusion and is almost always used as a stand-alone treatment. Recent data supporting the use of the pharmaco-invasive strategy as a third, reasonable option with results comparable to those of PCI has presented the opportunity to save more lives by delivering a more practical treatment in the majority of patients in LMICs.

Our Goals

STEMI India has been set up to address these issues with the following goals:

- **Research**
 - To develop systems of care appropriate for STEMI care in India and other low- and middle-income countries
- **Dissemination**
 - To inform and disseminate the latest information from across the world on STEMI management to all those involved in STEMI care in India
 - To help organize and train ‘STEMI teams’ in hospitals
 - To provide public education to reduce delays in accessing appropriate STEMI care
- **Execution**
 - To facilitate and contribute to developing a national STEMI guideline and establish a national STEMI programme in India
 - To help organizations and individuals in research projects with expertise and evidence-based protocols
 - To provide training and accreditation to institutions implementing the STEMI India Protocol.

The Tamil Nadu Pilot Project

STEMI India, supported by the Indian Council of Medical Research (ICMR), conducted a year-long pilot study in Tamil Nadu to study the impact of the STEMI India model - a protocol for efficient treatment of patients affected by STEMI.

The protocol addresses both the key problems in treatment of STEMI in India today - accurate diagnosis as well as choice of optimal treatment strategy.

The region covered under the STEMI India framework is divided into “clusters”. Each cluster is made up of one of two types (**Class A** with 24X7 cath labs or **Class B** with part-time cath labs) of “hub hospitals”, between 10 and 25 of two types (**Class C** less than 30 mins from the hub and **Class D** thrombolytic capable) of peripheral “spoke hospitals”, and a network of ambulances connecting these.

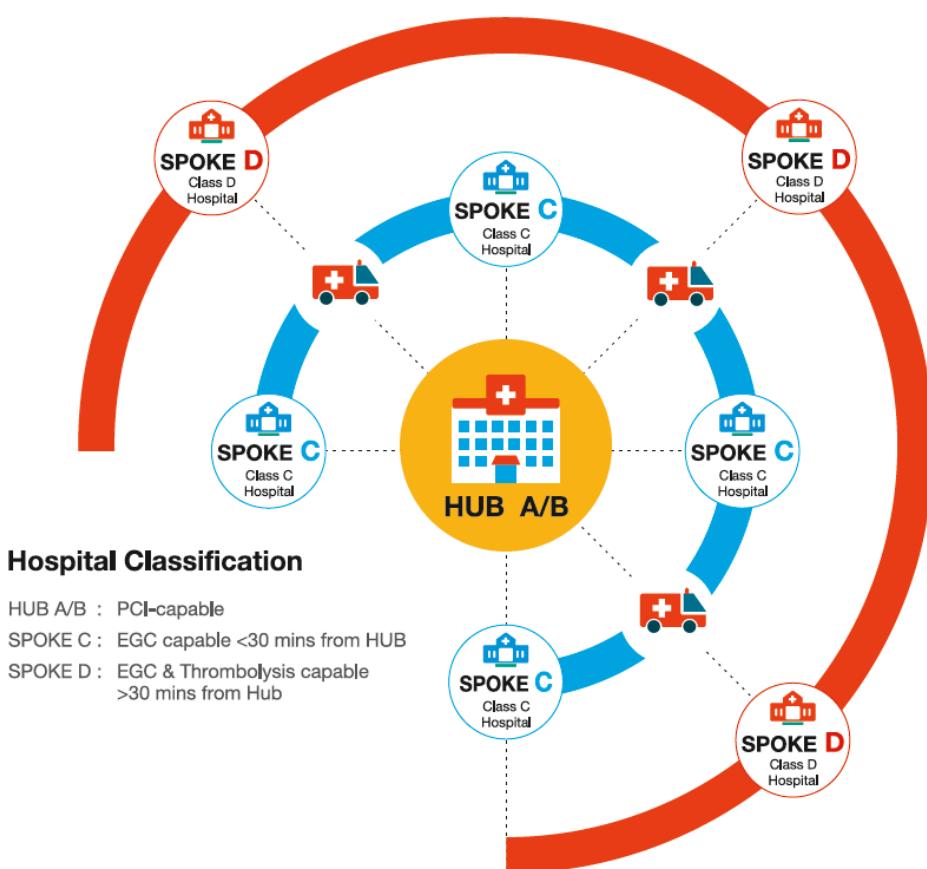


Figure 1: STEMI India's Hub-and-Spoke Model

A Multifunctional 12 lead ECG integrated multi-parameter monitoring unit with data entry capability (“STEMI Kit”) is installed in all ambulances and hospitals. It can record and transmit ECG and other

vital signs. A team of experienced cardiologists is available on-call 24X7 to diagnose the ECG sent to their mobile phone through the STEMI India application.

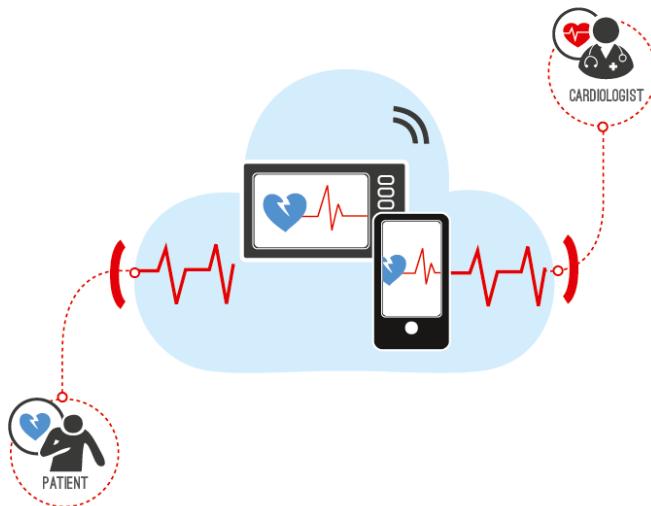


Figure 2: STEMI Kit schematic

Once STEMI has been diagnosed by the on-call cardiologist,

1. Primary PCI is advocated for patients located in urban areas close to cath labs.
2. Patients in rural areas, with long transportation times to PCI-capable hospitals, utilise the pharmaco-invasive strategy, of thrombolysis followed by catheterization and PCI if indicated, within 3-24 hours of thrombolysis.

Algorithms developed in-house by STEMI India automate, to the maximum degree possible, the process of advocating appropriate treatment for patients with STEMI, taking into consideration various parameters, both physiological and locational (distance from the nearest hospital).

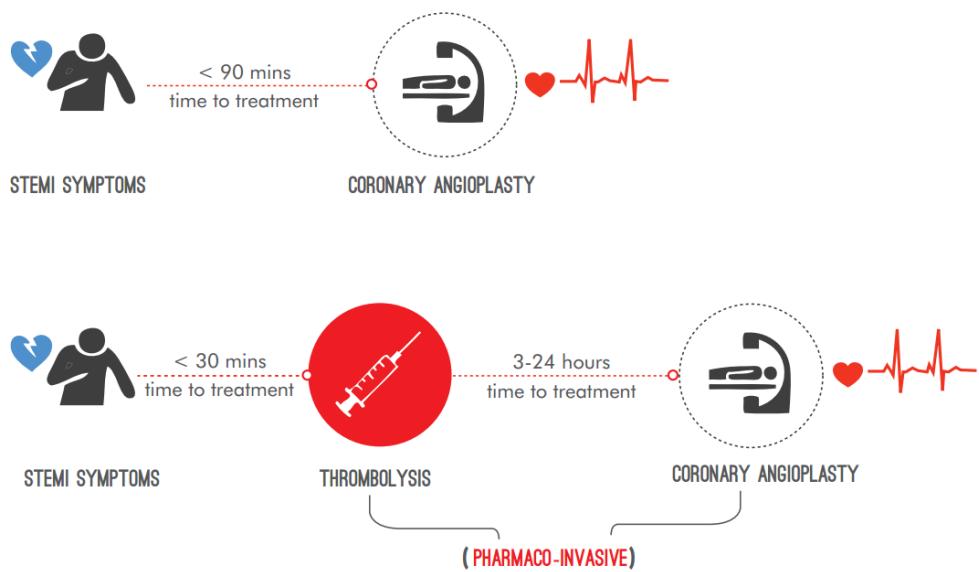


Figure 3: Primary PCI and Pharmaco-Invasive Strategies

The STEMI India TN Pilot Project studied the impact of this protocol over 4 clusters across Tamil Nadu (TN). Pre-implementation data was collected on 906 patients and post implementation data on 1,561 patients.

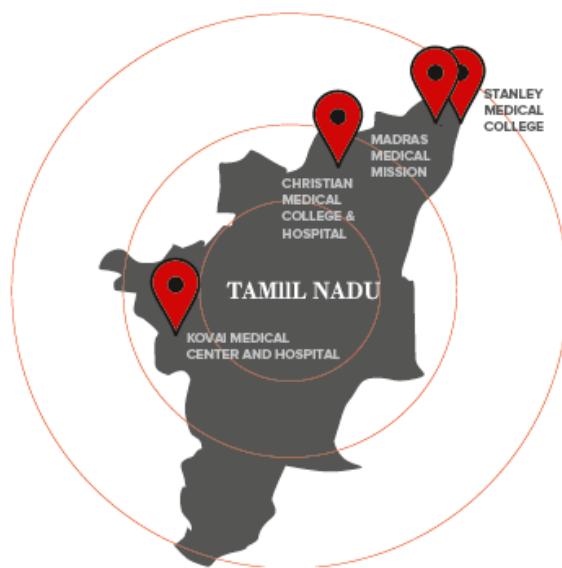


Figure 3: Cluster locations - Tamil Nadu Pilot Study

Analysis of the data showed that:

- It is possible to establish a system of care in India by combining the two strategies – Primary PCI and Pharmaco-invasive.
- Utilising technology to diagnose STEMI has helped in starting reperfusion treatment early especially in rural and poorly served areas.
- Pharmaco-invasive and Primary PCI have similar Mortality and MACE events, both significantly better than those of thrombolysis.
- Significantly greater number of patients utilised the superior strategy of Pharmaco-invasive therapy as compared to stand-alone thrombolysis – 13% to 20%.
- Significant numbers of the rural poor utilized the Below-Poverty-Line (BPL) insurance (0% to 60%) and were able to access the STEMI system of care and get best-in-class treatment of STEMI.
- The implementation of the STEMI India model of care produced an absolute mortality reduction of 3% (relative risk reduction of 21%) and an absolute MACE reduction of 5.5% (relative risk reduction of 16%).
- Cost-Effectiveness Analysis by WHO-recommended methods showed that the benefit gained are 81 additional lives saved per annum in a sample of 2,500 patients. This translates to Rs. 4 gained for the economy per rupee spent considering all future income of averted deaths.

The protocol was published in BMJ Open, and the final results of the TN Pilot Project have been published in several leading peer-reviewed journals such as Indian Heart, BMJ and JAMA (Journal of the American Medical Association) Cardiology.