

Acute coronary syndromes in India – Call for help?

Anitha Shenoy

Email: anitharshenoy@gmail.com

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Emergency medical services can make a significant difference in the outcome of certain conditions such as acute coronary syndromes and cerebrovascular accidents. This has been well recognised and clear cut health care systems are in place in the developed countries. For example, anyone in distress in the United States would know that dialing 911 would fetch them some kind of help and in a very short period of time. The people who attend these calls (emergency medical services) are well trained to identify the emergency, provide the initial treatment, if necessary in liaison with the base hospital and are able to reach the patient to the hospital in a reasonable time. When such clockwork like or precision systems are in place, as best an outcome as is possible for that condition can be anticipated.

The American Heart Association/American College of Cardiology has included the care of patients presenting with clinical features of acute coronary syndromes along with algorithms for advanced cardiac life support. The primary goals of therapy in these patients would be to preserve as much myocardial function as possible, prevent major adverse cardiac events such as life-threatening arrhythmias and nonfatal myocardial infarction (MI). Potential delays to therapy occur during 3 intervals: from onset of symptoms to recognition of its seriousness by the patient, during transfer to the hospital and during evaluation in the emergency department. The most common symptom is chest pain or discomfort lasting more than 15 minutes

but may also include discomfort in other areas of the body such as epigastrium, shoulder, neck, jaw or arms. There may be associated breathlessness, sweating, vomiting and dizziness. Patients with diabetes mellitus may not manifest with chest pain but may have only an episode of syncope. Emergency medical service providers also need to identify these symptoms to be able to deliver the patients to the appropriate hospital. The time from onset of symptom to reaching the hospital door is called symptom to door time.

In countries such as India, many other factors determine a patient's access to healthcare. There is a tendency to delay visit to the hospital: The reasons could be financial, social, fear of the unknown or simply ignorance. Indians are generally a group of stoic people and their upbringing usually involves teaching them a lot of patience and ability to sustain hardships. The usual response to any distress or discomfort is denial with a thought that *it would pass off with time* and the tendency is to *wait and watch*. The other reasons could be a wait for the bread-earner of the house to come home from work, wait for a more convenient time, wait for some or the other event to take place. Even when a decision is taken to visit a doctor, a local doctor or a nearby nursing home is chosen. Familiarity and easier access to the local doctor are important reasons for patients to opt for them. Ignorance is another issue, more so in rural areas. A visit to a bigger hospital or a referral centre happens, usually with much reluctance, only when it is inevitable and when advised by local doctors. This often takes away precious time for revascularisation and preservation of the myocardium in case of acute coronary syndromes. Many patients would not reach

Anitha Shenoy, MD, FRCA
Professor and Head of Anaesthesiology, Kasturba Medical College, Manipal

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the referral centre and that number will probably never be known. Only those who are lucky to have a reasonable myocardial function would ever reach the referral hospital. Apart from these, socioeconomic burden of hospitalisation is a major deterrent as studied by Jeemon P *et al.*¹

Dr Thomas Alexander *et al* describe this issue in their elegant paper titled ‘Systems of care for ST-elevation myocardial infarction in India’.² Several interesting facts have been described in this paper. The authors describe how coronary artery disease is a significant health care issue in India, not only among the rich but the middle class and poor families as well. They note that use of tobacco and limited access to affordable healthcare are significant issues. Health care spending by the government is a small proportion and has other priorities such as control of communicable diseases and nutrition. Although preventive programmes have received some focus, attention to the care of patients developing ST elevation MI (STEMI) needs improvement.

Encouraging development has been occurring in Indian healthcare in the recent years. One is the availability of GVK EMRI (Emergency Management and Research Institute) ambulance system (Call 108) across eleven states and covering about 372 million people at present. They currently have about 2800 ambulances and cost Rs 600 per trip. This system is expected to grow to 15000 ambulances to cover a population of about 1 billion in the next few years. However, the current utilisation rate of these ambulances is around 5%.²

The second significant development is increasing awareness of health insurance and availability of insurance cover for STEMI. Many government programmes such as Arogyashri now reimburse the costs of percutaneous intervention. Less expensive and newer generation Indian stents have also contributed to affordable healthcare for STEMI patients.²

The most complete data about trends in STEMI patients in India are seen in CREATE, a large clinical registry of acute coronary syndrome patients from 89 large hospitals in 10 regions and

cities across India.³ Among the 20,468 patients diagnosed to have ACS in CREATE, over 60% had STEMI, a proportion that is much higher than that reported in the western literature. Contrary to general expectations, STEMI patients were younger and had a lower socioeconomic status when compared to non-STEMI patients. The median symptom onset to door time was 300 min (5 hours) in STEMI patients. In addition, approximately 60% received fibrinolytic therapy and only 8% underwent percutaneous coronary intervention (PCI) during their hospitalisation.

The AHA/ACC recommends a *door to needle* time of 30 minutes and *door to balloon* time of 90 minutes.^{4,5} If the symptoms are identified as those of acute coronary syndromes, a quick transfer to a PCI capable hospital may reduce the time to definitive therapy and improve outcome. In a large clinical trial, the mortality rate was significantly reduced (8.9% versus 1.9%) when the transport time was *less than 30 minutes*.⁶ In patients presenting within 2 hours of symptom onset or when delays to PCI are anticipated, fibrinolytic therapy is recommended.⁷ Similar results are seen with percutaneous coronary intervention.^{8,9} Those with a contraindication to fibrinolytic therapy, however, or those in cardiogenic shock will still need to be shifted early to the PCI centre as early as possible. Although this is the recommendation from AHA/ACC, there is no definitive data regarding how long a delay in PCI would make initial fibrinolytic therapy more useful.

Henry and colleagues in their study divided participating hospitals into zone 1 (<60 miles) and zone 2 (60 to 210 miles) from the Minneapolis Heart Institute at Abbott Northwestern Hospital.¹⁰ All patients received a standardised treatment protocol based on American College of Cardiology/AHA guidelines and was common for the PCI centre, zone 1, and zone 2 hospitals. Patients in zone 2, however, received half-dose tenecteplase (if fibrinolytic therapy was not contraindicated) in anticipation of a lengthy transfer time. Despite the high-risk unselected patient population (cardiogenic shock, 12.3%; cardiac arrest, 10.8%; and elderly [≥ 80 years of age], 14.6%), the in-hospital mortality was 4.2%,

and median length of stay was 3 days. This study was designed to see whether regional systems can be developed to effectively transfer patients with ACS to PCI-capable hospitals. The study showed that well-planned and executed systems can be developed.

Ting and colleagues at the Mayo Clinic conducted a study wherein they developed a protocol to coordinate systems of care between the PCI-capable centre and the regional hospitals within 150 miles of the PCI centre.¹³ All patients (n = 131) presenting with STEMI within 3 hours of symptom onset received initial fibrinolytic therapy and were then transferred to the primary PCI centre whereas those who presented more than 3 hours after onset of symptoms (n = 105) were referred directly to the PCI centre. The median door-to-balloon time and mortality were not different between the two groups. Initial fibrinolysis is recommended in patients who present within two hours of onset of symptoms. They also opined that symptom onset time to balloon time was more significant than door to balloon time.

Both these studies concluded that rapid transfer of STEMI patients from community hospitals up to 210 miles from a PCI center is safe and feasible using a standardised protocol with an integrated transfer system.

The Kovai Erode Pilot Study initiative conducted in South India was similar. The investigators divided the area around their hospital (a tertiary care centre at Coimbatore, Tamil Nadu) into two grids: an inner and an outer, based on whether the ground transport time was less than 30 minutes or more than 30 minutes.² Patients developing acute coronary syndrome and living in the inner grid zone could be quickly transferred to the referral centre for percutaneous intervention whereas patients living in the outer zone could be transferred to the local centre for initial fibrinolysis and subsequent transfer to the referral hospital for percutaneous intervention. They educated all the doctors in the area (inner and outer zone) as well as ambulance service providers about this arrangement. Those administered fibrinolytic therapy were referred within 3 – 24 hours for cardiac catheterisation to the main hospital. Their results

showed that this approach was effective, workable and ‘real world’ solution. This study illustrates how coordinated systems can be developed between PCI centres and regional hospitals to effectively deal with acute coronary syndromes and in particular, STEMI. Jacobs *et al* describe this approach as *being in the right place at the right time*.³

The Kovai-Erode STEMI initiative has become a model for the development of the ‘not for profit’ national organisation called ‘STEMI India’. The investigators of the Kovai Erode initiative, however, mention how transport times are only part of the problem in India. They note that there are also financial implications for many smaller private hospitals. A shared compensation agreement will need to be developed between the smaller local hospitals and the referral (PCI capable) hospital for the general good of the public.

In conclusion, acute coronary syndromes are a major healthcare burden in India and a distinct national programme needs to be established. Public education, effective emergency medical services and efficient handling of the patients should improve outcome in the coming years. Respiratory therapists could become an important link in this chain by becoming part of emergency medical services team. They are trained not only in management of airway and respiratory failure but are also trained to provide basic and advanced life support when the scenario demands these skills. They could actively ensure effective and safe transfer of these potentially critically ill patients. A small percentage of patients could develop pulmonary oedema and cardiogenic shock requiring both oxygen therapy and other supportive treatment. If provided on time, these interventions make a difference to outcome.

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