STEMI Management Indian Perspective

STEMI: a growing concern in India

- The health care burden of ST elevation myocardial infarction (STEMI) in India is enormous.

- Yet, many patients with STEMI can seldom avail timely and evidence based reperfusion treatments.

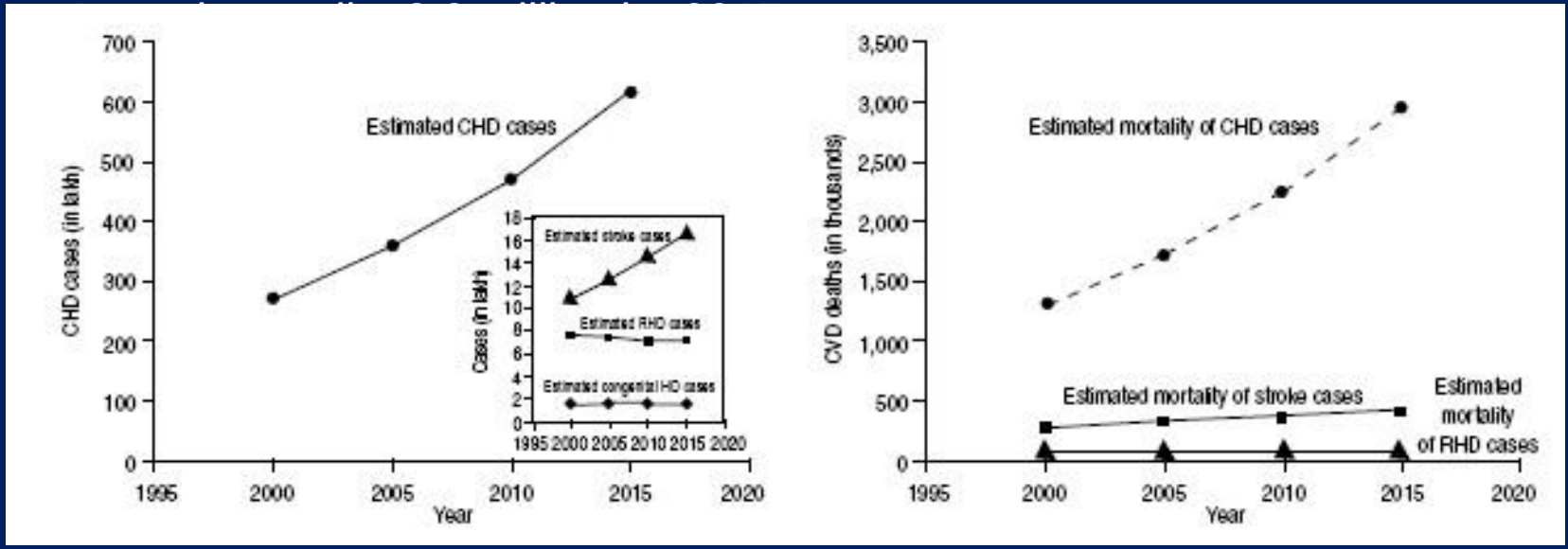
- This gap in care is a result of
  - financial barriers,
  - limited healthcare infrastructure,
  - poor knowledge and
  - accessibility of acute medical services for a majority of the population.

National Commission on Macro-economics and Health

Burden of Disease in India – Background Papers

Ministry of Health and Family Welfare – Government of India September 2005

- CVD expected to increase from 29 million in 2000 to 64 million in 2015 – mostly due to CAD
- 23 million of this below 40 years of age

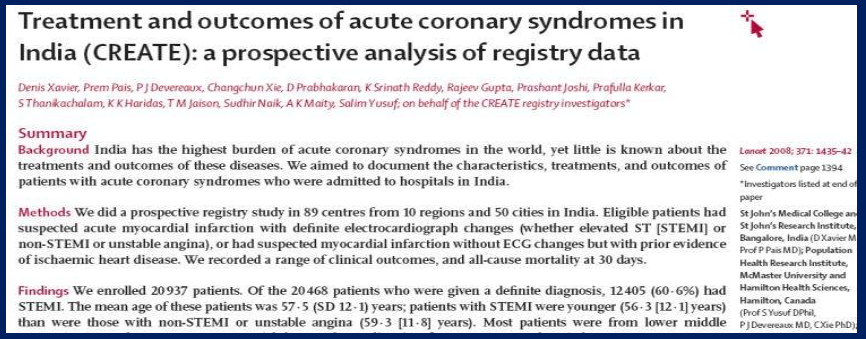


- By comparison, 13 million Americans, out of about 296 million, are currently estimated to have heart disease

Estimate (Guesstimate) of STEMI in India

- Probably 7.68 million would present with ACS
- 60% of this (according to the CREATE study) would have STEMI
- 3.5 - 4.6 million patients with STEMI yearly

CREATE Registry



Treatment and outcomes of acute coronary syndromes in India (CREATE): a prospective analysis of registry data

Denis Xavier, Prem Pais, P J Devereaux, Changchun Xie, D Prabhakaran, K Srinath Reddy, Rajeev Gupta, Prashant Joshi, Prafulla Kerkar, S Thanikachalam, K K Haridas, T M Jaison, Sudhir Naik, A K Maity, Salim Yusuf, on behalf of the CREATE registry investigators*

Summary

Background India has the highest burden of acute coronary syndromes in the world, yet little is known about the treatments and outcomes of these diseases. We aimed to document the characteristics, treatments, and outcomes of patients with acute coronary syndromes who were admitted to hospitals in India.

Methods We did a prospective registry study in 89 centres from 10 regions and 50 cities in India. Eligible patients had suspected acute myocardial infarction with definite electrocardiograph changes (whether elevated ST [STEMI] or non-STEMI or unstable angina), or had suspected myocardial infarction without ECG changes but with prior evidence of ischaemic heart disease. We recorded a range of clinical outcomes, and all-cause mortality at 30 days.

Findings We enrolled 20 937 patients. Of the 20 468 patients who were given a definite diagnosis, 12 405 (60·6%) had STEMI. The mean age of these patients was 57·5 (SD 12·1) years; patients with STEMI were younger (56·3 [12·1] years) than were those with non-STEMI or unstable angina (59·3 [11·8] years). Most patients were from lower middle

Lancet 2008; 371: 1435–42

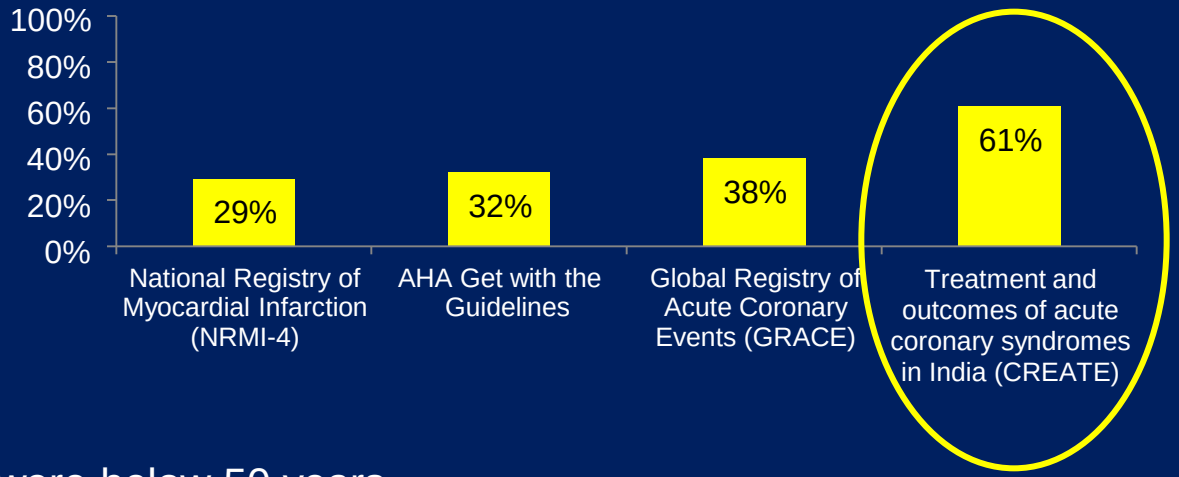
See Comment page 1394

*Investigators listed at end of paper

St John's Medical College and St John's Research Institute, Bangalore, India (D Xavier MD, Prof P Pais MD); Population Health Research Institute, McMaster University and Hamilton Health Sciences, Hamilton, Canada (Prof S Yusuf DPhil, P J Devereaux MD, C Xie PhD),

A prospective registry study 89 centres from 10 regions and 50 cities in India over a 4-year period ending in 2005.

- 20,468 patients with ACS of which 12,405 had a STEMI.



- 34% of STEMI were below 50 years
- 58.5% received thrombolytic and 8% PPCI
- The median time from symptoms to hospital was 360 (range 123-1317) minutes
- Only 4% travelled by ambulance
- Most patients pay directly for treatment

Xavier D, Pais P, Devereaux PJ, et al. Treatment and outcomes of acute coronary syndromes in India (CREATE): a prospective analysis of registry data. *Lancet* 2008; 371:1435-1442.

Treatments by SES (Socio-Economic Strata)

	Rich	UMC	LMC	Poor	p
Thrombolysis	61%	65%	63%	52%	*
Cor Angio	41%	36%	22%	9%	*
PCI	15%	13%	6%	2%	*
CABG	8%	5%	2%	1%	*
Antiplatelet	97%	98%	98%	98%	
Beta blocker	59%	61%	62%	50%	*
Lipid lowering	61%	59%	54%	36%	*
ACEI/ARB	63%	57%	57%	54%	*

Lancet 2008; 371:1435-1442.

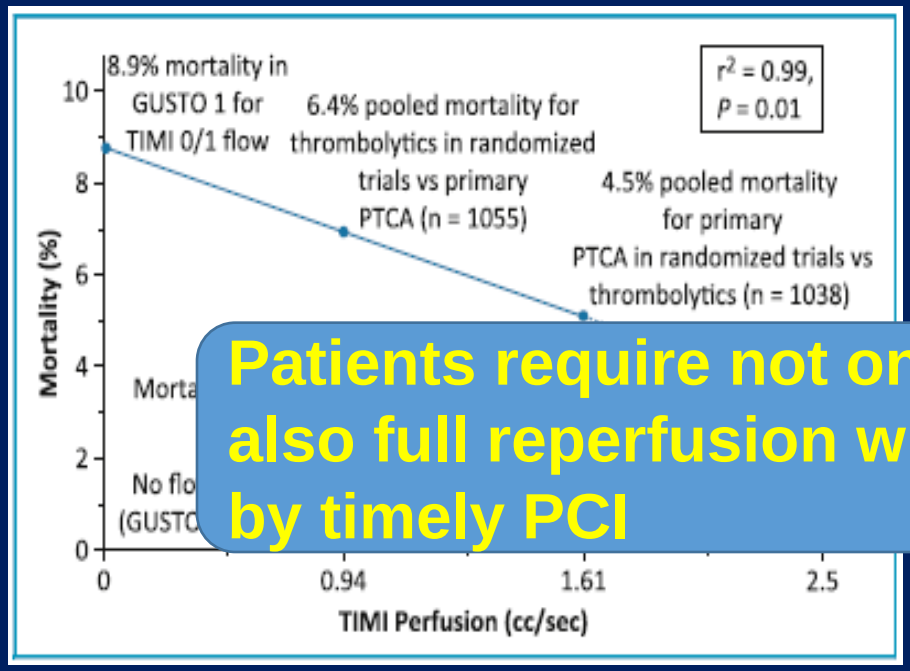
Mortality by SES(Socio-Economic Strata)

	Rich	UMC	LMC	Poor	P
Death rate (un-adj)	5.5	5.9	6.5	8.2	**<0.0001**
Death rate	5.1	5.9	6.7	7.8	**0.0093**
(adj-RFs)	**1.0**	**1.16**	**1.32**	**1.57**	
Death rate	6.9	7.0	6.5	6.7	
(adj- RF+Trt)	**1.0**	**1.01**	**0.94**	**0.96**	**0.9487**

RF: age, sex, prev MI, DM, HTN, smoking, BP, HR, Killip, BMI
Trt: type of hospital, time to hosp, in-hospital drugs, interventions.

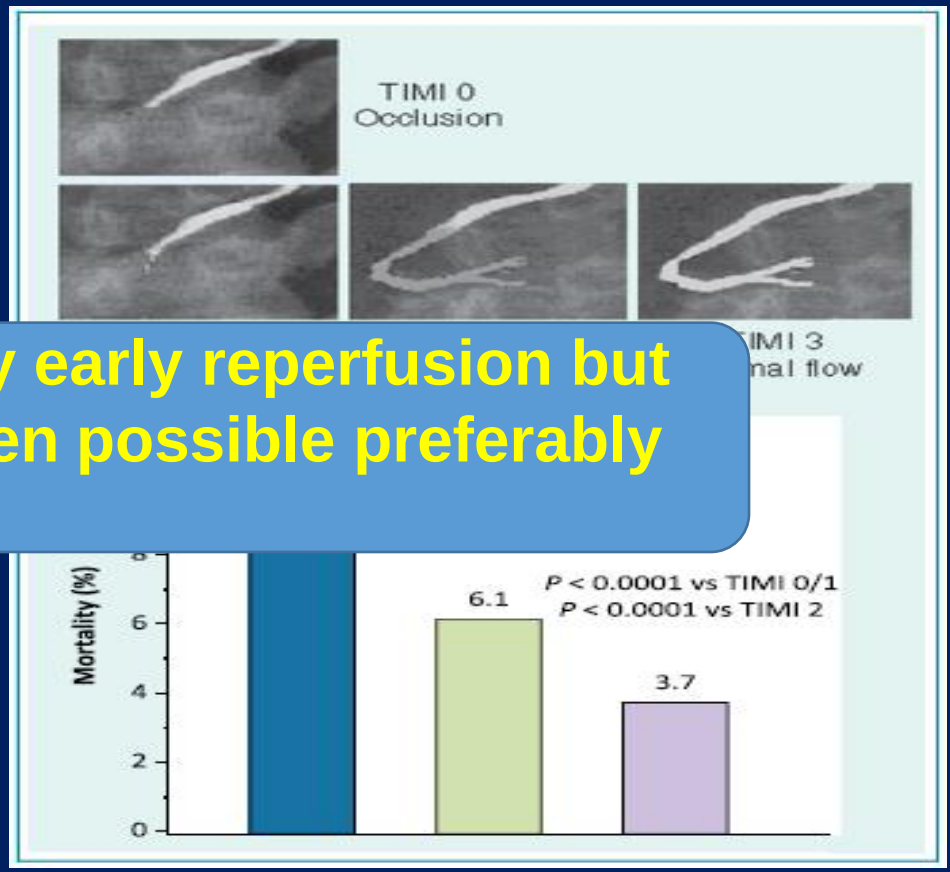
Lancet 2008; 371:1435-1442.

ST-elevation in the setting of ACS suggests that the pt is at high risk for morbidity and mortality.



Relationship between coronary blood flow
and mortality rate in pts with AMI [1]

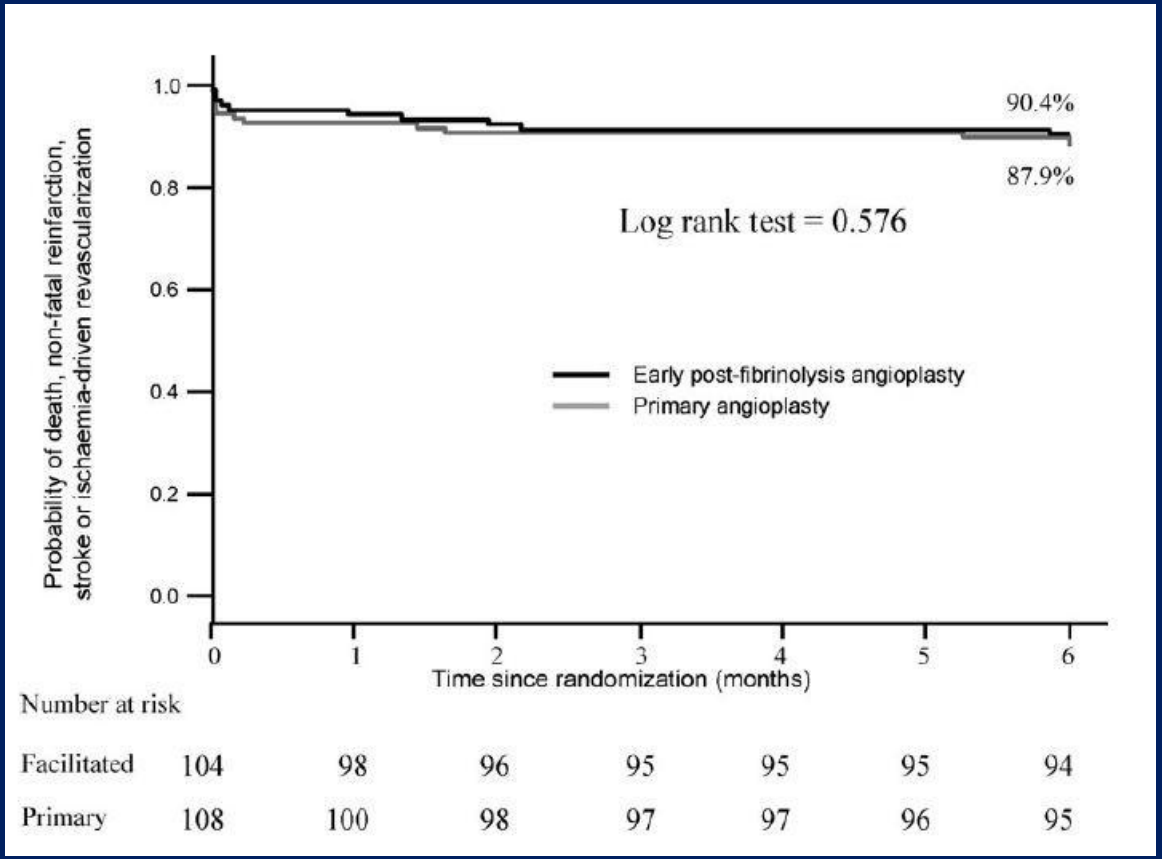
Patients require not only early reperfusion but also full reperfusion when possible preferably by timely PCI



Correlation of TIMI flow grade and mortality[2]

W.B. Saunders; 1999. p. 194
W.B. Saunders; 2012. p. 1111–70..

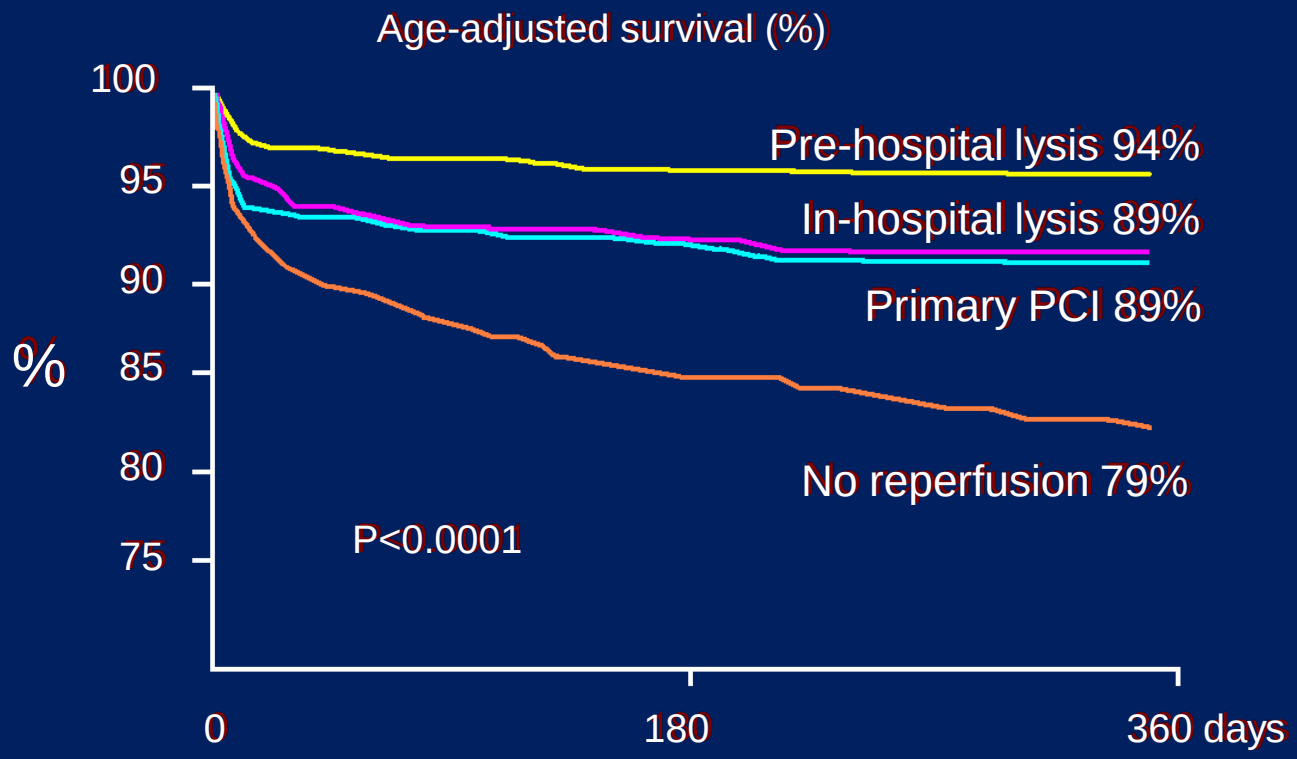
GRACIA-2 Facilitated intervention vs primary PCI in STEMI



Eur Heart J 2007 Apr;28(8):949-60

Pre-hospital thrombolysis vs primary PCI

French Nationwide USIC 2000 registry (n=1922)



Danchin et al, Circulation 2004;110:1909

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RSS

Systems of care for ST-elevation myocardial infarction in India: is it time?

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ABSTRACT

The prevalence of coronary artery disease and ST-elevation myocardial infarction (STEMI) are increasing in India. Although recent publications have focused on improving preventive measures in developing countries, less attention has been placed on the acute management of STEMI. Recent policy changes in India have provided new opportunities to address existing

has risen dramatically over the past two decad
Approximately 3–4% of Indians in rural areas a
8–10% in urban areas have CAD.[10] Moreov
Indians are more likely to develop CAD at youn
ages during an individual's working years, and
a result, there is an extremely high loss of pot
tially productive years of life in India. Amo
working-age adults (35–64 years old), nearly

Need for a STEMI system of care in India?

- Despite all its recent and substantial economic advances, many people in India remain poor.
- CAD is a major contributor of death and disability in India.
- Approximately 3–4% of Indians in rural areas and 8–10% in urban areas have CAD.
- Indians are more likely to develop CAD at younger ages during working years
- High loss of potentially productive years of life.

Heart 2012 Jan;98(1):15-7

Need for a STEMI system of care in India?

- Among the more than 20 000 patients enrolled in CREATE, over 60% had STEMI, a proportion that is substantially higher than in North American and European registries.

- The median time from the onset of symptoms to hospital arrival was 300 min in STEMI patients, more than double the delay reported in developed countries.

- ~60% received fibrinolytic therapy and only 8% underwent PCI during their hospitalization.

Heart 2012 Jan;98(1):15-7

ACC/ AHA Guidelines recommendation: Achieve Coronary Patency

- **Initial Reperfusion Therapy**
  - Defined as the initial strategy employed to restore blood flow to the occluded coronary artery
- **3 Major Options:**
  - Pharmacological Reperfusion
  - PCI
  - Acute Surgical Reperfusion
- **Under both Pharmacological and PCI are listed several lower recommendations & investigational reperfusion strategies**

Class I All patients should undergo rapid evaluation for reperfusion therapy & have a reperfusion strategy implemented promptly after contact with the medical system

Antman et al. JACC 2004;44:680.

ACC/ AHA Guidelines recommendation: Importance of Early Reperfusion Therapy in STEMI

Outcomes Dependent Upon:

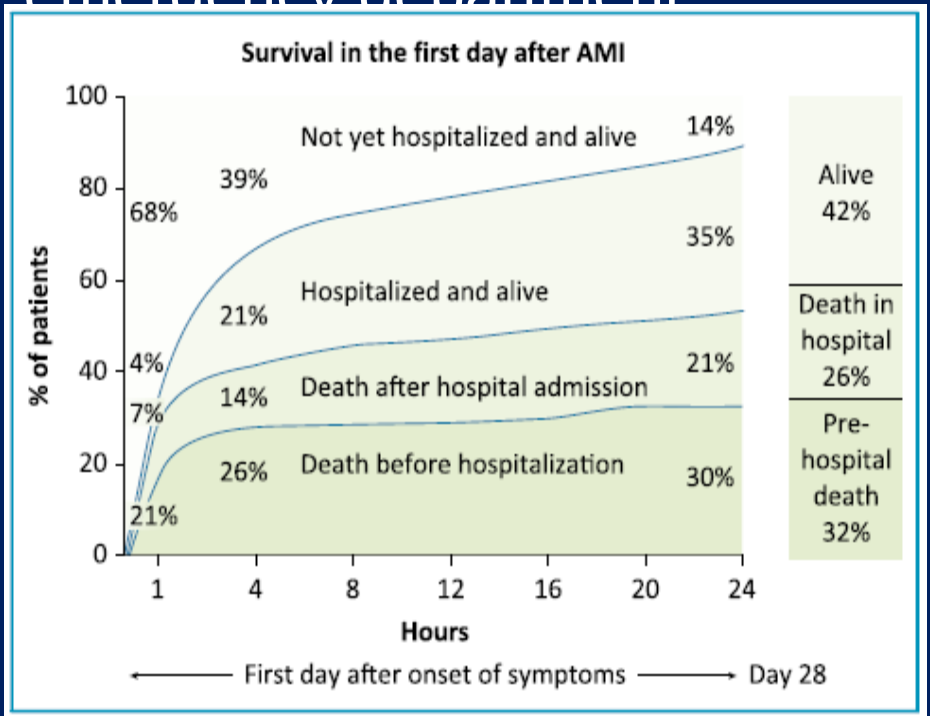
- Time to treatment-TIME IS STILL MUSCLE
- Early and full restoration in coronary blood flow
- Sustained restoration of flow

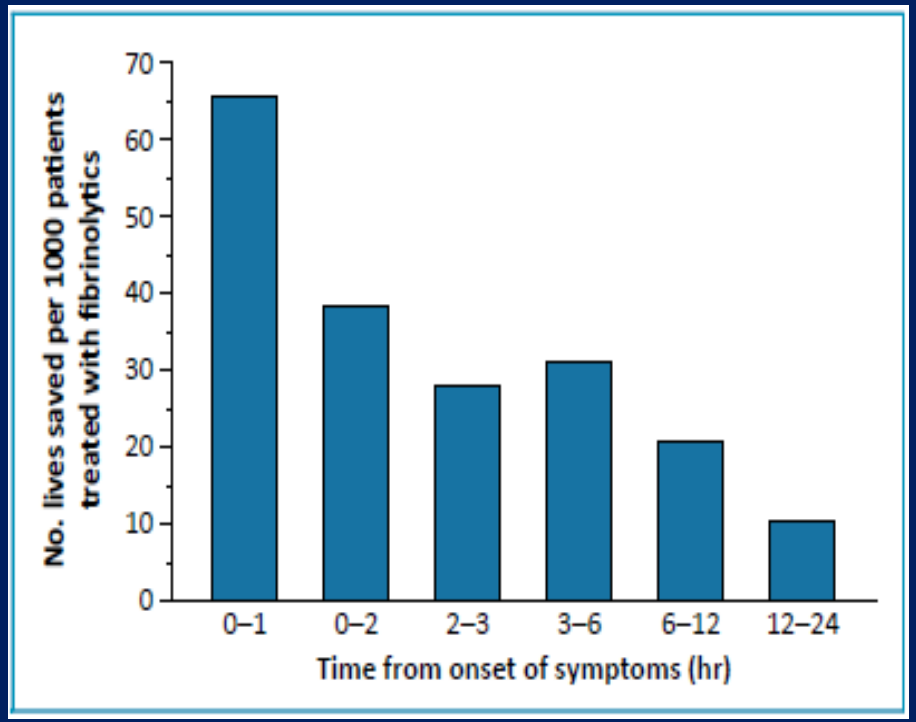
Antman et al. JACC 2004;44:680.

Management of STEMI

Prehospital and initial management.

More than one-half the mortality in AMI occur within 1 h of onset of symptoms before the patient can reach the emergency department



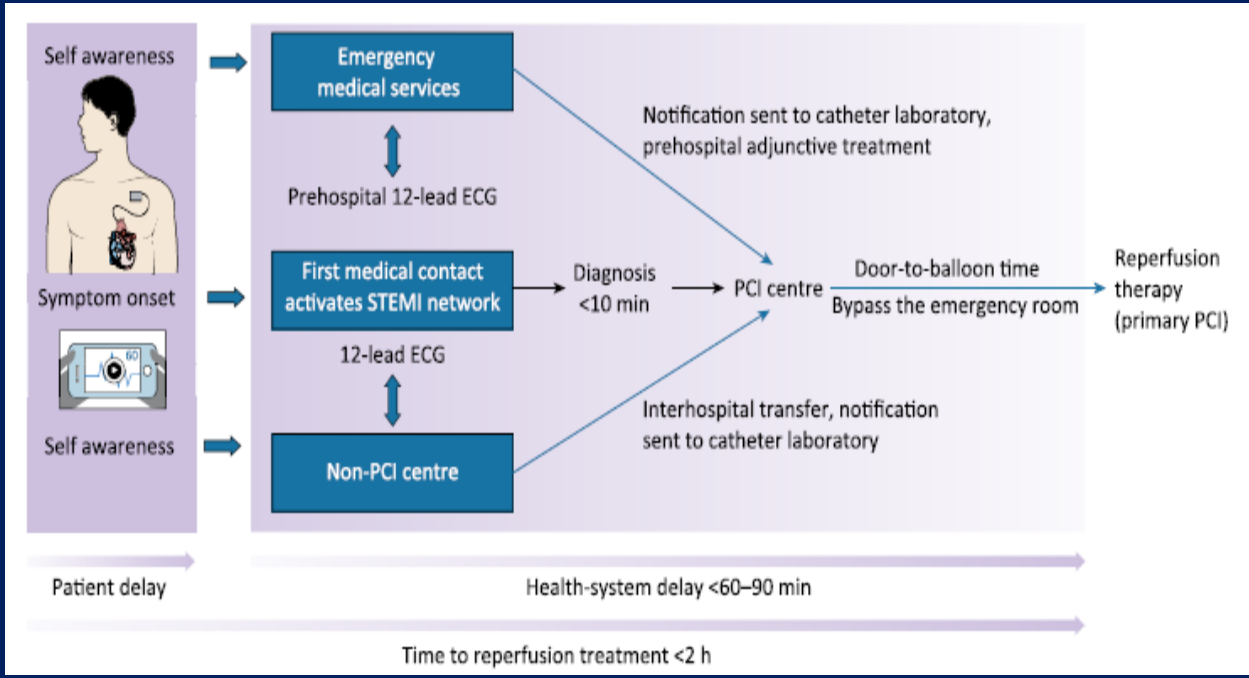


Dtsch Med Wochenschr 1991;116:729-733.
Boersma et al. Lancet 1996;348:771–5.

Management of STEMI

Patient delay in management.

- There is a time-critical therapeutic window starting with symptom onset until reperfusion therapy for STEMI



Patient-related and health-system delays in the STEMI management continuum

Windecker et al. Lancet 2013;382:644–57

Management of STEMI

Patient delay in management.

- The greatest time lag to reperfusion is the patient's delay in seeking medical assistance.
  - Awareness through direct encounter with an at-risk patient.
  - Encourage to seek immediate medical attention when they have symptoms of ACS.
  - Encouraged to properly use chewable aspirin and sublingual nitroglycerine when available and to call emergency services when such symptoms persists for >5 min.

Crit Pathw Cardiol 2004;3:128–33.

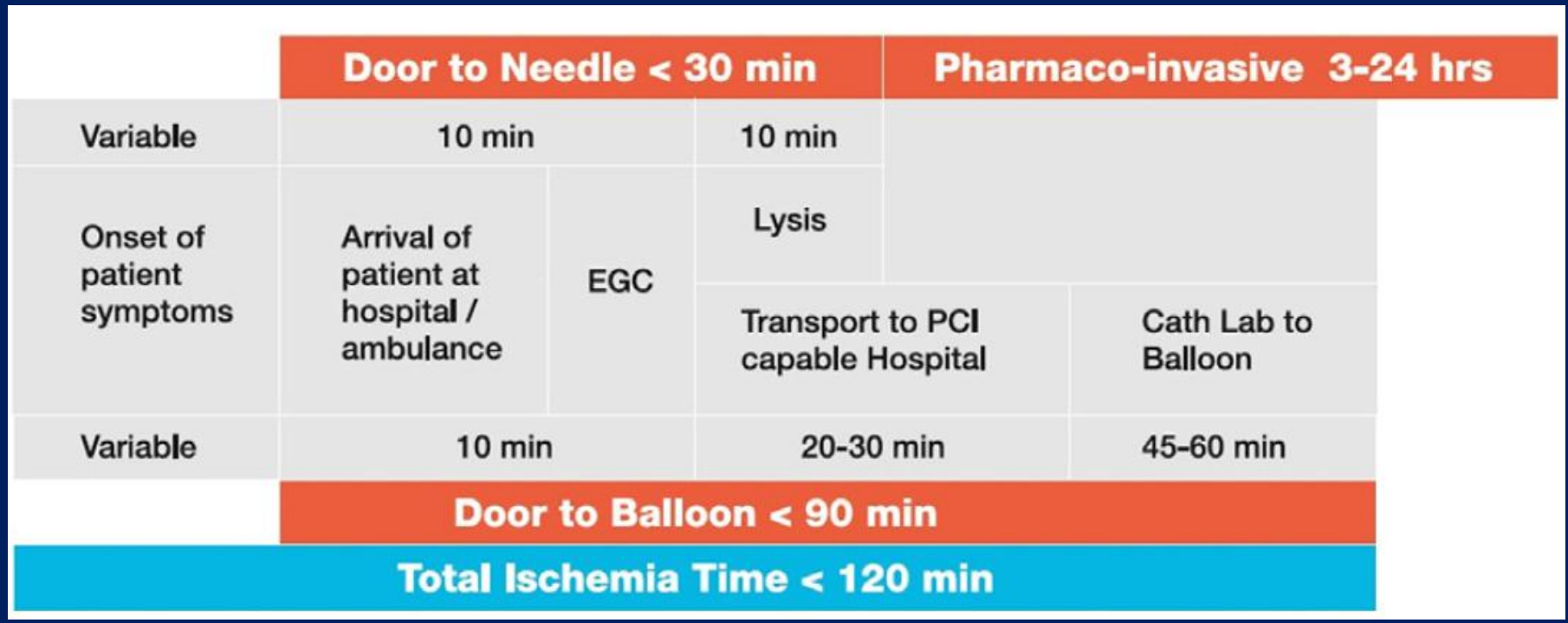
Management of STEMI

Emergency medical systems

- Important opportunity in LMIC is
  - Expanding the ability to perform prehospital ECG,
  - Delivering pre-hospital fibrinolysis,
  - Developing a robust EMS
- Developing an ambulance service is a priority in most developing countries.

GLOBAL HEART, VOL. 9, NO. 4, 2014: 469-510

Recommended timelines for management of STEMI in India.



To implement two strategies in STEMI management using

a)Primary PCI in those patients with short transportation times, and

b)Pharmaco-invasive strategy in those with long transportation times

Indian Heart Journal 67 (2015) 497 – 502

An attempt for effective management of STEMI in India

Kovai Erode Pilot STEMI Study

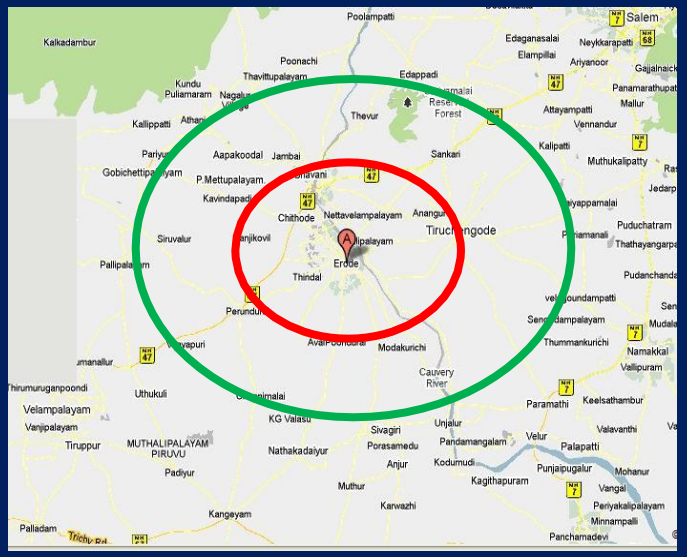
STUDY OBJECTIVE

To assess the feasibility of developing a local STEMI system of care using a rural district as a unit.

To test the feasibility and effectiveness of the two strategies in STEMI management

a) Primary PCI in those patients with short transportation times, and

b) Pharmaco-invasive strategy in those with long transportation times



Inner Grid- include short transport times of less than 30 minutes and

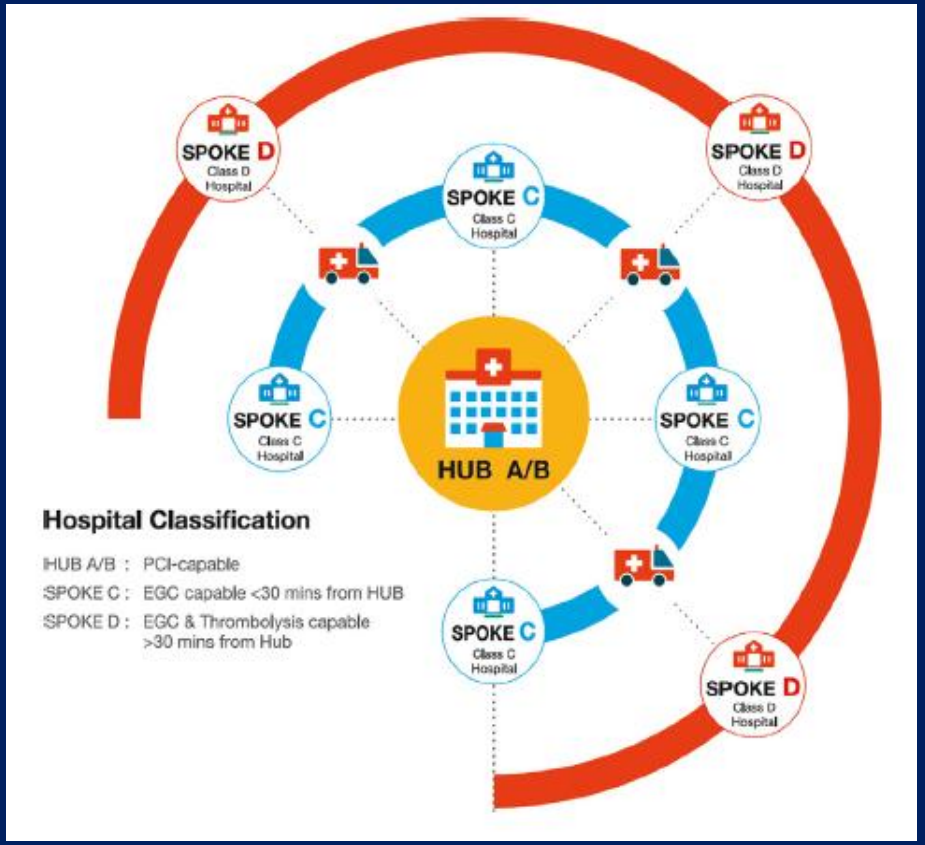
Óuter Grid- include those beyond 30 minutes transport time.

- 84 patients over a 6 month period
- 54% travelled from outer grid
- Mean time of arrival from symptom onset 170 mts and 77% by ambulance
- Hospital arrival to PCI – PPCI 69 mts and PI was 480 mts

Heart 2012 Jan;98(1):15-7

Developing a STEMI System of Care

- Equitable and Inclusive model
- Hub and spoke model to be developed to link the STEMI hospitals and to combine the two strategies of
  - Primary PCI and
  - Pharmaco-invasive treatment



- STEMI accredited hospitals to manage patients with STEMI
- Insurance payments linked to following appropriate guidelines
- Ambulance to bypass non STEMI hospitals and take to nearest STEMI accredited hospital

Indian Heart Journal 67 (2015) 497 – 502

Tamilnadu STEMI Project – 3 Key Aspects

- Technology Development: to overcome manpower and infrastructure deficiencies

- To ensure that all patients in the cluster are able to access the ‘state of the art’ STEMI care

GVK EMRI Ambulance system

- To ensure that all patients – especially the poor and disadvantaged are able to afford this care. Linked to

Tamilnadu Chief Ministres Comprehensive Health Insurance

- Planned to cover 80% of populationRs.400,000/- per family in blocks of 4 years
- Special Categories opened specifically for the STEMI Program
- Covers thrombolysis and PPCI

BMJ Open. 2013;3:e003850

Globalization of STEMI system of care project in India

- Care at other locations requires standardization to meet best practices.
- Protocols need to be simple and straight forward to eliminate complexity.
- Local adoptions of these standardized protocols will require education of healthcare providers.
- Protocols should be translated into local languages to increase their usefulness to patients and local healthcare providers
- But the core essence of the processes recommended should be maintained.

Indian Heart Journal 67 (2015) 497 – 502

STEMI Management in India

For the National STEMI program to be successful requires a clear partnership between the various key stakeholders.

- The state government
- State wide ambulance network
- Cardiological Society of India (CSI)
- Association Physicians of India (API)
- STEMI India will lead the national program by setting the national strategy and facilitating its implementation in different states.
- Public: Engagement to educate patients

Indian Heart Journal 67 (2015) 497 – 502

Summary

- STEMI is growing concern and major health care burden in India.

- STEMI management in India evidently require organized systems of care to improve key processes.

- A proper“systems of care” for STEMI management will create new opportunities to deliver adequate reperfusion therapies in India by addressing various clinical, logistical and societal factors.