EDITORIAL

No STEMI Left Behind

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The sheer size and complexity of acute coronary syndrome care within the globe's largest democratic country, comprising 1/6 of the world population, constitutes an issue of such enormous scope that it is challenging to find an appropriate beginning or ending. Moreover if current trends persist without correction, this monumental challenge promises to extract a huge economic burden from both the Indian economy and its poor and middle income citizens who face catastrophic financial consequences in the event they experience major cardiovascular illness.

It is customary to address gaps in the provision of care as part of quality assurance efforts. After our review of registry data and informed opinion pieces from some sectors of the Indian cardiovascular community it seems clear that such gaps are abundant.[1-3] These are summarized in Table 1.

Public education about the risk factors for CV disease and the symptoms of myocardial infarction are lacking and hampered by illiteracy and socio-cultural factors. There is a dearth of effective emergency services and an uneven distribution of tertiary care facilities: such facilities comprise approximately one fifth of hospitals that care for ACS patients. Whereas 2/3 of the Indian population is rural, most hospitals are urban and many have no cardiologist.[2]

Table 1 : Key Issues Affecting STEMI Care in India

• Rising incidence of ACS and STEMI component
• Limited availability and access to emergency services
• Lack of public funding and health insurance
• Private hospitals with financial incentives for procedures
• Major heterogeneity in care
• Limited public education
• Social / cultural impediments to behavior change

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Against this background a well reasoned consensus statement on STEMI care appears in this issue of the Journal. Intended for practicing clinicians period.

It was formulated by nine experts after a consultative process that engaged over 150 individuals from the internal medicine, emergency medicine and interventional cardiology communities representing 16 regional states.[4] After collating the most recent evidence, including that from the STREAM trial (that the authors of this editorial led) the expert panel argues for timely primary PCI if feasible while recognizing that a pharmaco-invasive approach is likely to be more practicable in many instances.[4,5]

Both the CREATE and Kerala registry data highlight one of the most fundamental major issues in STEMI care within India also shared by many other regions of the world i.e. that between 40-60% of patients receive no reperfusion therapy.[1,2] Moreover a disturbingly high fraction of non STEMI patients received inappropriate fibrinolysis indicating the critical need for professional education in STEMI care especially amongst non-cardiologists who are most likely to be the point of first medical contact.

While we have good reason to support a pharmaco-invasive approach in the large cohort of STEMI patients who cannot receive timely PCI in an expert 24/7 tertiary facility, is it wise and realistic to propose this therapy for all STEMI patents in India? We suggest there is a need for sober second thought and a viewing that these recommendations be reflected in a social, cultural and economic context. We agree that high risk STEMI patients who comprise approximately ¼ of the population deserve special consideration as do those

with major recurrent ischemia. This also applies to STEMI patients with substantial myocardial territories at risk in whom fibrinolysis fails and would thus benefit from rescue PCI: similarly it applies to those patients in whom fibrinolysis is contraindicated. However fibrinolysis with appropriate anti platelet and anticoagulant therapy alone will have a major beneficial impact on outcomes. The three year mortality from DANAMI 2 indicate that the three quarters of patients receiving fibrinolysis alone with TIMI risk scores < 5 fared equally well to those undergoing primary PCI.[6] In the event that tenecteplase is employed, we would add an important caveat to the India STEMI consensus statement; namely that the dose of tenecteplase be reduced by 50% in patients ≥ 75 years given the improved safety profile observed after this modification in the STREAM trial.[5] Given that the large number of STEMI patients needing reperfusion and appreciating that the cost of a PCI with a bare metal stent is approximately 3-4 times the annual income of a poor family, the need for a balanced approach seems clear.[7] It seems obvious today that in many poor rural regions routine post-fibrinolysis angiography is not possible. For these STEMI patients a low cost fibrinolytic agent e.g. streptokinase and aspirin (even without additional anticoagulant therapy) is perhaps the only available reperfusion therapy. The benefit of this therapy is well established and far superior to no reperfusion therapy at all.[7] We would consider this the "minimum standard of care" that should be offered to all STEMI patients in these poor regions and contend it is well aligned with the still- current admonition from the 2004 ACC/AHA STEMI guidelines i.e. that "*the appropriate and timely use of some form of reperfusion therapy is likely more important than the choice of therapy*".[8]

There are several reasons to be optimistic about the future of STEMI care in India. Public private partnerships and selected government insurance programs are emerging to widen access to health care.[9] Creative initiatives to enhance pre hospital care such as the GVK EMRI ambulance system supporting a hub and spoke model for STEMI care are encouraging: this has worked well in other venues.[10] India's pharmaceutical industry shows genuine promise in bringing more cost effective solutions to bear upon the huge heath care burden for e.g. the polypill initiative aimed at cardiovascular disease prevention.[9]

Despite inadequate public funding for health care, India's government has shown recent interest in investing in research through funding bodies such as the Council for Medical Research aimed at reducing disease burden.[9] Demonstrating the value of publically funded health care and the development of a paramedical infrastructure to accelerate and enhance acute cardiovascular care are deserving of emphasis and support. We commend the STEMI India group for their collaborative spirit in developing the current guidelines. They can make an even greater impact by leading the charge in support of national and regional registries to benchmark quality of care and initiate "made in India" research projects that serve the unique needs of their population spanning from acute cardiovascular care to primary and secondary prevention.

References

1. Xavier D, Pais P, Devereaux PJ, Xie C, Prabhakaran D, Reddy KS, Gupta R, Joshi P, Kerkar P, Thanikachalam S, Haridas KK, Jaison TM, Naik S, Maity AK, Yusuf S, on behalf of the CREATE registry investigators: Treatment and outcomes of acute coronary syndromes in India (CREATE): a prospective analysis of registry data. *Lancet* 2008;371:1435–42.
2. Mohanan P, Mathew R, Harikrishnan S, Krishnan MN, Zachariah G, Joseph J, Eapen K, Abraham M, Menon J, Thomas M, Jacob S,Huffman MD, Prabhakaran D, on behalf of the Kerala ACS Registry Investigators: Presentation, management, and outcomes of 25 748 acute coronary syndrome admissions in Kerala, India: results from the Kerala ACS Registry. *Eur Heart J* 2013;34:121–9.
3. Karthikeyan G, Xavier D, Prabhakaran D., Pais: Perspectives on the management of coronary artery disease in India. Heart 2007. *Heart* 2007;93:1334-8.
4. Dalal JJ, Banerjee PS, Iyengar, SS, Kerkar, P, Mullasari, A, Rao, D, Sathe S, Thomas A, Wander G S, Sangole NV, and the Cardiocare STEMI experts: Consensus Statement for Early Reperfusion and Pharmaco-invasive approach in patients presenting with chest pain diagnosed as STEMI (ST elevation myocardial infarction) in an Indian setting. *JAPI* 2014;62:473-483.
5. Armstrong PW, Gershlick AH, Goldstein P, Wilcox R, Danays T, Lambert Y, Sulimov V, Ortiz FR, Ostojic M, Welsh RC, Carvalho AC, Nanas J, Arntz H-R, Halvorsen S, Huber K, Grajek S, Fresco C, Bluhmki E, Regelin A, Vandenberghe K, Bogaerts K, Van de Werf F, on behalf of the STREAM Investigators: Fibrinolysis or Primary PCI in ST-Segment Elevation Myocardial Infarction. *N Engl J Med* 2013;368:1379-87.
6. Nielsen PH, Maeng, M, Busk, M, Mortensen LS, Kristensen, SD, Nielsen, TT, Andersen, HR, for the DANAMI-2 Investigators: Primary Angioplasty Versus Fibrinolysis in Acute Myocardial Infarction Long-Term Follow-Up in the Danish Acute Myocardial Infarction 2 Trial. *Circ* 2010;121:1484-91.
7. ISIS-2 (Second International Study of Infarct Survival) Collaborative Group: Randomised trial of intravenous streptokinase, oral aspirin, both, or neither among 17,187 cases of suspected acute myocardial infarction: ISIS-2. *Lancet* 1988;2:349 –60.
8. Antman EM, Anbe DT, Armstrong PW, Bates ER, Green LA, Hand M, Hochman JS, Krumholz HM, Kushner FG, Lamas GA, Mullany CJ, Ornato JP, Pearle DL, Sloan MA, Smith SC Jr, Alpert JS, Anderson JL, Faxon DP, Fuster V, Gibbons RJ, Gregoratos G, Halperin JL, Hiratzka LF, Hunt SA, Jacobs AK, Ornato JP: ACC/AHA guidelines for the management of patients with ST-elevation myocardial infarction: A Report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines (Committee to Revise the 1999 Guidelines for the Management of patients with acute myocardial infarction). *J Am Coll Cardiol* 2004;44:e1-e211 and *Circulation* 2004;110:e82-e292.
9. Vamadevan AJ, Shah BR, Califf RM, Prabhakaran D: Cardiovascular research in India: A perspective. *Am Heart J* 2011;161:431-8.
10. Alexander T, Mehta S, Mullasari A, Nallamothu BK: Systems of care for ST-elevation myocardial infarction in India. *Heart (Lond)* 2012;98:15-17.