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Development of Systems of Care for ST-Elevation Myocardial Infarction Patients The Physician Perspective

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The physician's overarching role in the development of systems of care for ST-segment-elevation myocardial infarction (STEMI) is to advocate for achieving the goal of early infarct-artery patency for all patients with STEMI. An effective STEMI care system relies on a team of multiple physicians, nurses, emergency medical services (EMS) personnel, and other providers to work in an efficient, collaborative manner to deliver optimal patient care. Urgent, direct activation of the EMS system by the STEMI patient is ideal.

Successful first response care by EMS or emergency department (ED) personnel followed by rapid access to revascularization requires standardized, evidence-based STEMI treatment protocols in accordance with the most current American College of Cardiology (ACC)/American Heart Association (AHA) guidelines. Physicians participating in the development of these protocols should include both interventional and noninterventional cardiologists, emergency medicine specialists, EMS physicians, and primary care physicians. Furthermore, to more effectively achieve success in developing and implementing these systems and networks, physicians must demonstrate a new paradigm of leadership, including the following:

1. A passionate and credible commitment to the goal of achieving timely infarct artery patency for all patients with STEMI;

2. An ability to obtain the full cooperation, collaboration, and support of hospital senior management and medical staff at local, referral, and regional levels;
3. The development and implementation of innovative team-based methods for overcoming professional, organizational, and regulatory barriers to ideal STEMI treatment;
4. Effectiveness in implementing protocols that are flexible with regard to geographic and other local issues;
5. Mastery of the use of efficient and credible clinical information systems that support timely data collection, quality and outcomes measurement, feedback, and transparency for both internal and public quality improvement initiatives; and
6. Prompt data collection and feedback.

Ideal STEMI Systems

Currently, primary care and specialist physicians tend to work separately rather than in integrated networks in caring for patients with STEMI, particularly at entry into the medical system. The ideal system encompasses multidisciplinary teams to ensure that optimal care according to ACC/AHA guidelines is delivered on entry, in the hospital, at discharge, and over the long term, within the patient's local system after discharge.¹⁻³ At each step, the physician will play a critical and clearly defined role.

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†Deceased.

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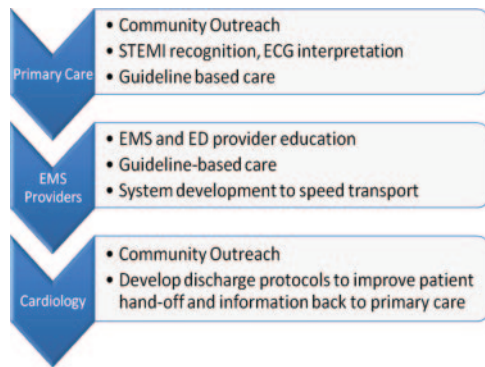


Figure 1. Physician educational opportunities.

Community Education

It is recognized that major time delays from patient symptom onset to presentation for medical care exist. Physicians, particularly primary care physicians, should pursue a leadership role in community education (Figure 1), promoting early recognition of ischemic chest pain and the need to call 9-1-1 quickly at the onset of chest discomfort.^{4,5} This could be accomplished during office visits, using posters and pamphlets, and by speaking at community functions regarding the importance of calling 9-1-1 when experiencing severe chest pain or other symptoms of acute myocardial ischemia. Both primary care and emergency physicians could be helpful in training paramedics and ED personnel to accurately interpret 12-lead ECGs. Ongoing training and education of ED and EMS providers should be part of a written regional plan for STEMI care. These requirements for physician leadership are irrespective of the type of center or system.

Non-Percutaneous Coronary Intervention-Capable Hospitals

Non-percutaneous coronary intervention (PCI)-capable hospitals include all centers either without primary PCI capability or without availability of PCI on a 24-hours-per-day/7-days-per-week basis. A regional standardized transfer protocol should be applied consistently for the entire 24-hour period.^{3,6,7}

Initiation of Care

The primary care and emergency physicians should immediately recognize and accurately diagnose ECG signs of STEMI. They should also be comfortable with the differential diagnosis of ECG abnormalities associated with chest pain, including pericarditis, myocarditis, hypertrophic cardiomyopathy, aortic dissection, and other clinical entities.⁸

Hospital Care

Emergency physicians and cardiologists should promptly initiate care in accordance with published ACC/AHA guidelines based on duration of symptoms, minimizing delays in transport that include but are not limited to those based on weather conditions, severity of patient illness, and bleeding risk. Protocols may include transportation for primary PCI or full-dose fibrinolytic therapy with optional rescue PCI based on current guidelines.⁹

Transfer Issues

All STEMI patients should be considered for transfer to a PCI-capable center after appropriate, expedited, on-site initiation of care. Patients receiving fibrinolytic therapy should be considered for timely transfer for potential rescue PCI.^{6,10-14} A referral hospital door-to-receiving hospital balloon time should be a measure of quality.

PCI-Capable Hospitals

EMS and air ambulance medical directors, emergency physicians, and interventional cardiologists should interact in a seamless fashion with a common goal of achieving infarct-related artery patency in STEMI patients as quickly as possible.^{1-3,7,13-15}

Emergency Physicians

Emergency physicians should accurately interpret 12-lead ECGs transmitted from patients with chest pain in the field (eg, EMS, helicopter) or in non-PCI-capable hospitals. They should be knowledgeable about evidence-based treatments for arrhythmias and hemodynamic emergencies. In addition, they should have access to a global STEMI notification system, capable of simultaneously activating the catheterization laboratory and interventional cardiology teams while the patient is still en route from the field or transferring hospital.

Interventional Cardiologists

When on call, interventional cardiologists and staff should respond to the ED within 20 to 30 minutes of activation based on local conditions so as to meet ACC/AHA guidelines on door-to-balloon times.¹⁶ They should be familiar with system and network strategies to achieve and sustain reperfusion of the infarct artery. Interventional cardiologists should also be familiar with the treatment strategies for higher-risk patients, including intra-aortic balloon counterpulsation and other left ventricular support, as well as ventilatory support techniques. They must be involved with discharge protocols that ensure short-term and long-term guideline adherence for secondary prevention medications, smoking cessation, cardiac rehabilitation, and screening for depression. Long-term outcome measurement systems should be developed with input from all providers. They should also be aware of the need to optimize patient and family education needs as lengths of stay decrease. Interventional cardiologists must assume responsibility for the seamless transition of the patients and all their information back to the local cardiologist and primary care provider.

Outcomes Reporting and Quality Initiatives

A complete outcomes reporting process should be mandated for all components of STEMI systems. There should be formal benchmarking, case review, and risk-adjusted institutional and provider comparisons (Figure 2).

Physicians should be leaders in continuous quality improvement initiatives for STEMI programs within a clinical team that includes EMS personnel, emergency physicians, nursing staff, and catheterization laboratory teams and should implement strategies to continuously improve chest pain onset-to-reperfusion times. Outcomes, including mortality and morbidity, and time to treatment measures should be

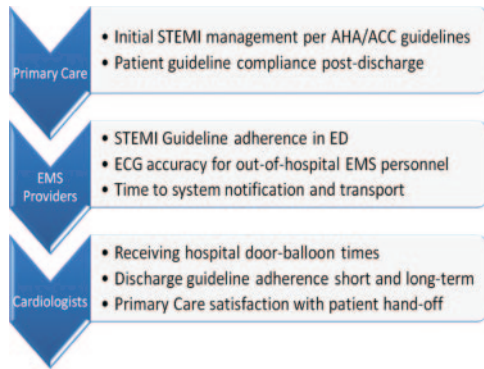


Figure 2. Outcomes measurement opportunities.

consistent with national databases. Long-term measures such as medication adherence, smoking cessation, and lipid and blood pressure control should be developed and reported in a continuous quality improvement program. It is important to consider care as a continuum that extends beyond the acute in-hospital phase of STEMI care.

Physician Training in Continuous Quality Improvement Techniques

Physicians should be trained in tools for process and system improvement design. This includes education of those in practice and those in residency and fellowship training.

Physician Qualifications

Physicians should meet ACC/AHA guidelines for STEMI care. Interventional cardiologists performing primary PCI should be board-certified or board-eligible in interventional cardiology, comply with published guidelines for procedural volume, and participate in standardized quality registries for PCI and STEMI.¹⁶

Gaps and Barriers

Rural Settings

Rural physicians may lack the volume of STEMI patients to maintain up-to-date knowledge of STEMI care issues. They also may lack easy access to the educational opportunities available in larger cities or larger physician group settings. They are usually full-time family physicians who not only staff the ED but also maintain full office practices. They must be capable of providing care across the spectrum from pregnancy to end-of-life issues and for acute issues such as trauma. In this setting, timely and easy access to educational materials (preferably Internet-based) is critical. Furthermore, written protocols may help address practice variations in real-world practices.

Transfer Policy Issues

Loss of Patients

Hospitals and physicians both may be reluctant and raise concerns about diverting patients to competing institutions.¹⁷ Furthermore, current policies require ambulance services to transport patients with suspected STEMI to the nearest acute care hospital. Cardiac care is often one of the most prestigious, most marketed, and most profitable service lines.

Financial Issues

Resources: Personnel and Data Systems

As hospitals either lose money or shift resources to profitable endeavors, the money for implementing quality programs may not be forthcoming. Information systems, staff to collect and verify data, and a dedicated meeting time for staff and physicians currently are not reimbursed by payers. However, investment in quality infrastructure may ultimately result in cost savings.

Physician Time

Many physicians have experienced decreasing reimbursement for services and must work more to maintain stable incomes. Often, benefits accrue to hospitals and third-party payers rather than physicians.¹⁸ However, physicians are important drivers for both quality care and cost of care. An ideal system should appropriately align the goals and incentives for all stakeholders, including physicians, patients, hospitals, and payers.

Recommendations

Research

1. Determine how movement of patients, and possibly physicians, from non-PCI-capable hospitals to PCI-capable centers will affect patient care.
2. Determine whether an adequate number of interventional cardiologists will be trained to meet the demand of increased numbers of STEMI patients undergoing primary PCI.
3. Determine whether simulation training for STEMI patient process of care is effective in improving patient outcomes.

Programs

1. Establish community networks where constituents (physicians, patients, EMS, administrators, and payers) meet to make appropriate referrals occur reliably.
2. Develop programs for a seamless interface with patients and their local primary care providers after discharge from a PCI center. These programs should focus on guideline-based discharge tools (AHA's "Get With the Guidelines" or ACC's "Guidelines Applied in Practice") and include measurement of patient compliance both early and late after discharge with a feedback cycle to effect improvement.

Policy

1. Align financial incentives with desired outcomes. This may include gain-sharing arrangements as in recent Centers for Medicare and Medicaid Services demonstration projects.¹⁹
2. Develop effective quality measurements and tools to assess the effectiveness of physicians and other healthcare providers in counseling patients on early activation of EMS and long-term adherence to discharge recommendations according to ACC/AHA guidelines. These measurements must be proven to reflect improvement in long-term outcomes.
3. Provide (regional) education on STEMI to physician constituents. Develop tools for education of providers.

Disclosures

Potential conflicts of interest for members of the writing groups for all sections of these conference proceedings are provided in a disclosure table included with the Executive Summary.

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