Need for Centers to Care for Patients With Acute Coronary Syndromes

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Acute myocardial infarction (MI) characterized by ST-segment elevation on the ECG has been the subject of more randomized trials and outcome studies than any other area of medicine. Recently, non–ST-elevation acute coronary syndromes (ACS) have taken an equal position in terms of clinical study and clinical relevance. Additionally, through a series of frustrations and triumphs, the critical nature of prehospital management of ACS has been underscored. This attention is appropriate, given the dominance of coronary artery disease (CAD) as the leading global cause of death and disability.

Despite this abundance of evidence, however, ample studies have reported the common failure to deliver the standard of care in clinical practice. We believe that the establishment of regional centers for ACS, if linked with the communities in which they exist and if approached in a reasonable fashion with appropriate financial incentives, would result in much more effective and efficient care of this dominant public health problem.

Medical Care and Medical Errors

Our understanding of medical quality and prevention of medical errors has advanced substantially in the past decade. By conducting clinical trials that measure outcomes as the primary measure, we can develop standards of care, and adherence to these standards of care can be used to estimate quality. Specifically, on the basis of theories developed from discovery science and clinical observations, clinical trials can address the consequences of new therapies or new approaches to treatment for populations of patients. When an adequate trial provides definitive evidence, a clinical practice guideline (CPG) recommendation can carry a Level of Evidence A or B and Class I status (if a beneficial practice) or Class III status (if detrimental). When such a recommendation can be quantified, it then can become a performance indicator. For example, patients with ST-segment elevation ACS should receive reperfusion therapy as a medical emergency. In patients without a contraindication to either percutaneous coronary intervention (PCI) or fibrinolysis, treatment of 100% of patients with either therapy would be a reasonable expectation. A score can be developed on the basis of the proportion of patients treated according to definitive CPG recommendations. The sum of scores on an array of performance indicators then may provide an overall measure of quality for a hospital or practice.

This approach has been called “the continuous cycle of quality” (Figure). Major national projects, such as Get With the Guidelines, the Cardiac Hospitalization Atherosclerosis Management Program (CHAMPS), the Guidelines Applied in Practice (GAP) project, the National Registry of Myocardial Infarction (NRMI), and the Can Rapid Risk Stratification of Unstable Angina Patients Suppress ADverse Outcomes with Early Implementation of the ACC/AHA Guidelines (CRUSADE) project, have emphasized the value of a focus on system quality. Only by systematically measuring processes and outcomes can we be assured that they are improving.

Some types of issues are not amenable to randomized trials, including measurement of the relations between outcomes and types of clinical practice. Area-variation studies can now provide insight into differences in outcomes among populations and as a function of provider. In general, studies have shown that a patient will do better when treated in centers that commonly encounter the problem exhibited by
the patient (“practice makes perfect”). Furthermore, many studies of complex medical illnesses have shown better outcomes with specialty care, whereas more straightforward outpatient cases may fare better with generalist care. Thus, not only do we know that particular practices are beneficial in ACS, but we also have evidence that hospital volume and access to specialists both provide a distinct advantage.

**Impact on Finances**

In addition to its preeminence as a cause of death and disability, CAD represents a critical determinant of the financial success of hospitals in the United States. In hospitals with sufficient volume, cardiovascular service lines are highly profitable. Indeed, profits made from the care of patients with cardiovascular disease often are used to offset other deficits at medical centers. Under current circumstances, then, a cardiac service line is a crucial component of a financially viable hospital. An interesting component of this issue is that profitability is somewhat driven by volume. This consonance between quality and profitability related to volume provides a basis for opportunity.

**What Do We Know About ACS?**

Major CPGs have been updated recently for both ST-elevation and non–ST-elevation ACS. The nomenclature itself represents a major change, with the subdivision of ACS into the ST-segment elevation and non–ST-segment elevation groups. Of interest, although non–ST elevation ACS is much more common and carries a 6-month mortality rate similar to that of ST-elevation ACS, the vast majority of data from clinical trials has emanated from ST-elevation studies until only recently.

The ST-elevation trials have shown clear benefits of reperfusion therapy and have defined the broad use of β-blockers, angiotensin-converting enzyme (ACE) inhibitors, antithrombin agents, and antiplatelet therapies. Recent individual trials and overviews have also stressed the dominance of PCI over fibrinolysis, placing pressure on the system to make more catheterization laboratories available.

Non–ST-elevation trials have likewise shown clear benefits of antithrombin and antiplatelet therapies, as well as the value of using cardiac troponins to stratify risk and to identify patients who might benefit from approaches that are more aggressive. As in the ST-segment elevation trials, the use of coronary angiography and revascularization is critical to achieving the best outcomes, and another major trial has confirmed these findings after the recent publication of revised guidelines.

For both conditions, a standard set of predischarge practices is beneficial, including smoking cessation advice, aspirin, β-blockers, and ACE inhibitors in patients with left ventricular dysfunction. Although evidence for the benefit of early statin use is weaker, if they are not started before discharge, they are unlikely to be started later.

Deaths before reaching the hospital continue to exceed deaths after reaching the hospital. Prehospital care is increasingly being driven by evidence from trials, and we now know that prehospital fibrinolysis is better than awaiting hospital arrival for a primarily fibrinolysis-driven treatment approach, and that, at a minimum, prehospital ECG in an integrated system can speed time to treatment. We have trouble in the United States delivering the basics of emergency care, however, much less the complex therapies in the field that could markedly improve the proportion of patients treated early. Much of this problem stems from the separation of responsibilities between hospitals and emergency services, such that most hospitals have an incentive to provide intense care once patients arrive but have no motivation to put major effort into what happens before the patient reaches the “fortress.”

Considerable research also has examined health services. Outcomes in ACS, both ST-elevation and non–ST-elevation,
are better at high-volume institutions, and specialty care seems to provide a benefit. Several studies have reported the volume-outcome relationship. Centers with invasive facilities also have better outcomes, although whether this reflects the facilities or the presence of greater clinical expertise has been debated. Patients with a final diagnosis of myocardial infarction have better outcomes if cared for by cardiologists, and these better outcomes are at least partly due to better adherence to professional CPGs. Of course, substantial data exist to support the volume-outcome relationship in PCI which has become relevant to both conditions.

In non-ST-elevation ACS, a large study has shown that centers with better adherence to professional standards have better outcomes. Peterson and colleagues showed that when centers were scored on the basis of adherence to CPGs and scores were summed over the different recommendations, those with better adherence had significantly lower mortality rates. The estimated life-saving effect of better adherence was greater than the estimated effect of reperfusion.

Alternatives
Consider the consequences of the current “free-market” approach. The care of patients is not coordinated and individual centers have little chance of implementing or measuring performance. It is not uncommon for patients to endure long treatment delays at centers that lack full capability for ACS intervention. Hospitals competing for catheterizations in the same geographic region, past certain general volume levels, dilute the ability to provide high-volume, efficient service with a guarantee of timely availability of a highly skilled operator and team. Recent data have shown that, for bypass surgery, the removal of certificate of need has led to a proliferation of low-volume centers, with a corresponding increase in mortality rates, compared with states maintaining a certificate-of-need program.

Compare this situation with the formation of ACS centers. ACS centers would allow organizing the delivery of acute care in a way that ensures that every patient will be treated in a high-volume, high-skill environment. Smaller facilities could be used as triage points for initial therapy with stratification of patients into risk categories on the basis of clinical findings, protein markers, ECG findings, and imaging results. By comparing adherence to guidelines and outcomes among these regional facilities, a continuous cycle leading to better performance could be created with adequate volumes to have meaningful measurements. These regional centers should be held responsible not only for delivering expert care within their walls but also for implementing evidenced-based strategies in the community to improve the dismal record for prehospital care. Additionally, these centers could be encouraged (through reimbursement mechanisms) to participate in national research projects aimed at improving the outcomes of these patients.

The only arguments against this approach stem from concern that centralization of services will encourage rationing and lead to bureaucratic control of physician privileges, while also worsening the tenuous financial status of small community hospitals. Any system must take these concerns seriously, so that innovation can continue in this dynamic area of medicine.

Summary and Conclusions
The case for regional ACS centers is compelling from an objective point of view. With higher volumes and systematic delivery of care, a continuous cycle of quality can be created. Outcomes should improve, and patients will have greater assurance that they will be in experienced hands with systems of high quality. The current reimbursement system will need adjustment to reward hospitals and physicians for acting to improve patient outcomes rather than trying to hang on to profitable services while delivering lower-quality care.

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