

Attack programs in chest pain centers

Robert L. Jesse, M.D., Ph.D.

Dr. Jesse is associate professor, internal medicine/cardiology; director, acute cardiac care, Virginia Commonwealth University Health System, Medical College of Virginia; and chairman, cardiology section, McGuire Veteran Affairs Medical Center

Evaluation of the patient presenting with chest pain or related symptoms suggestive of ischemia should always proceed in a systematic fashion. We believe that protocols should be implemented that are goal driven, risk based, and time dependent. In the most basic form chest pain protocols should

- rapidly rule in acute myocardial infarction (AMI) and initiate therapy
- rapidly rule in unstable angina and initiate therapy
- define other high-risk patients and treat appropriately

While this is a simplistic approach, many health care systems have yet to initiate even the most basic of systematic strategies: In the absence of such, diagnostic initiatives are frequently misdirected, financial justification is often difficult, and future demands cannot possibly be met. The most serious manifestation of this is the high incidence of missed AMI. What then is the problem? Simply put, the tools at our disposal in the acute setting are inadequate to fully define all high-risk individuals.

1. Sensitivity is inadequate. Based solely on history, physical exam, and electrocardiogram (ECG), the provider is expected to distinguish between nonacute coronary syndrome (non-ACS), unstable angina, and AMI. The missed AMI rate has been reported to be 2% to 5%.
2. Errors are costly. Missed AMI accounts for 20% of the malpractice payouts for emergency department (ED) physicians. In the Physician's Insurance Association of America (PIAA) report on missed MI, only 10% of settled tort claims had the correct diagnosis with an average payout of approximately \$150,000 versus \$250,000 for those 90% where "failure to diagnose" was cited.
3. Clinical symptoms can be misleading. In the PIAA report, over 90% of the patients had some degree of chest pain, but many do present atypically. Gastrointestinal (26%) and musculoskeletal (21%) etiologies are common misdiagnoses in these cases. Further, classical risk factors, or their absence, are poor predictors of acute ischemia, yet in many cases carry heavy weight in the differential diagnosis.

Unfortunately, efforts to improve on this are frequently misdirected. When the wrong solutions are applied, or the correct solutions are applied inappropriately, other problems are created.

1. In an attempt to reduce the missed AMI rate, the practice has been to increase the number of patients admitted to the hospital; as expected, the missed AMI rate is inversely proportional to the admission rate. The result of this practice has been the expenditure of an estimated \$3 to \$6 billion to hospitalize patients with noncardiac chest pain.
2. An even more disturbing finding is that less than 20% of the malpractice claims for missed MI are directed against ED physicians, with almost 70% against primary care physicians. The problem is not one limited to the ED; the ED is the initial site of contact in only 35% of these suits, while the office is 51%. Despite this the major effort at reducing missed MI is directed at the ED.
3. Another problem is that most suits result from younger and apparently lower-risk groups. The highest volume of suits involve patients ages 40 to 49 (32%) and 50 to 59 (27%). In fact, nearly three quarters are directed against those younger than 60, while the mean age for MI is approximately 64. Keep in mind, however, that two populations tend to have more atypical presentations: the very elderly and diabetics.

It is interesting that only about half of the suits were because AMI was not considered. In over half, failure/delay in ordering tests is cited, and failure/delay in admission is cited in nearly 40%. This clearly points to system failures, and it is just such problems that protocols and pathways are intended to prevent. Thus, to adequately address this problem, solutions must be directed at appropriate targets, applied to the correct patients, and implemented at the proper time.

In a white paper, the American College of Emergency Physicians outlined the components for a chest pain evaluation unit. These included recommendations for

1. attack program

2. observation program
3. unit design
4. unit staffing
5. unit management
6. outreach program

However, because it is venue dependent the entire program is predicated on getting patients into the unit in a timely fashion. Unfortunately, the National Institutes of Health (NIH)-funded REACT program failed to demonstrate any significant reduction in the delays to hospital presentation for patients with AMI in response to concerted educational programs. This suggests that education alone will not solve the problem, and that access may be an important component. The PIAA data suggest that a hospital-based program driven by ED admissions will at best be able to solve only about one third of the problem. Effective programs must deal with access as a major component for effective outcomes. Toward this end we have proposed the "virtual chest pain evaluation unit," which is community based and is defined by

1. broad access
2. systematic evaluation
3. process driven
4. outcomes driven
5. communication
6. education

This must involve other health care professionals in the initial evaluation and triage of patients, and specifically must rely on the primary care office as a major input into the system. In this way, entry into the chest pain program is not limited to the doors of the hospital ED, but rather can be any place where there are knowledgeable practitioners with the appropriate tools and commitment. A major caveat to broadening access is that patients be in a protected environment. This mandates that access to defibrillation be an integral part of the program. Further, that the tenets of risk stratification and systematic care be applied in a rigorous fashion as they are in the ED. Several key components are required:

1. Patient education: this includes a concerted effort to identify high-risk patients and to initiate risk-factor modification to reduce the incidence of ACS. Most importantly, it is to teach the signs and symptoms of an ACS and the appropriate response should this occur to reduce delay times.
2. Staff education: this mandates teaching the appropriate management of patients presenting with chest pain including all the components developed for the ED such as immediate response, rapid evaluation (including history, physical exam and ECG), and stabilization. This also must address how to handle phone calls (e.g. "I'm having heart burn, can I schedule an appointment?"), and the development of action plans for all contingencies. All efforts must be directed at minimizing delay times.
3. Risk stratification: the components that define risk in the office are identical to those in the ED. Thus, as risk is assigned, protocols can be initiated for each risk level.
4. A plan: including risk-based responses for both patients and staff is important, but the involvement of the EMS system and an effective interface with the hospital-based program are also essential.
5. Communication: interaction among the hospital-based chest pain protocol, the community inputs, the EMS system, and the physicians is key to the success of the program.

The above components collectively define the "virtual" community-based chest pain evaluation unit. As with effective ED-based programs, this is defined by the application of systematic processes of care. But unlike the ED-based program, it is not subject to the limitations of venue. In both cases there remain constraints based on the limited sensitivity of the history, physical, and ECG. Thus, subsequent testing is required irrespective of the site of initial evaluation and should always be dictated by the initial risk assessment. It is the application of this technology that must be used to improve sensitivity to acceptable levels.

I will reiterate that the single most important action to be taken on behalf of the chest pain patient is to get them into a protected environment. The most immediate potential cause of death is from arrhythmias; therefore, defibrillation capability is an absolute necessity. Currently, this is limited to the EMS and hospitals. However, with the advance of public access defibrillators, all physicians' offices should invest in this capability.

Conclusions

Chest pain represents a high volume, high cost, and potentially high-risk cohort of patients. A majority of these patients will turn out not to have a cardiac etiology for their symptoms. But, among those that appear to be at low risk for this, a small number will have bad outcomes. Failure to identify these patients and act accordingly is costly.

However, recognize that finding these few patients is also costly. If the PIAA data are to be believed, hospital-based chest pain evaluation units are unlikely to solve the entire problem since the ED is not always the initial site of contact and the role of the ED physician is limited. Further, the REACT study demonstrated that education alone (at least as it was applied in the study) is not the only problem. Thus, we believe that access remains a major component of this, and that a more inclusive community-wide approach must be taken. Physician offices can be enlisted as entry sites into the chest pain evaluation process, but not until defibrillation capability is uniformly present, and only when the interface to the hospital-based programs has been built and tested, these cannot be used as stand-alone operations.

No matter where patients are initially evaluated this must be performed systematically, and should proceed in a hierarchical fashion. The outcomes for the highest risk cohort dictate the need for urgency, while the poor outcomes among a limited number of the low-risk cohort dictates the need for thoroughness. The ability to accommodate the two extremes is the hallmark of an effective chest pain evaluation unit.