The challenge of chest pain in the emergency room: now and the future

Emergency departments (ED) are the most crowded and busiest location in the hospital. The large number of patients relative to the ED capacity makes the ED a challenge to maintain patients’ safety and quality of care, with a major potential impact on their survival and future quality of life.

Every year, millions of patients visit the ED seeking assessment and health care. Some 20% of these patients have chest pain and 60% are admitted to the hospital in order to rule out acute coronary syndromes (ACS). In actuality, no more than 15% are eventually diagnosed with an ACS, resulting in a huge number of inappropriate admissions and wasted resources. On the other hand, more than 5% of presumed low-risk patients are discharged, to later develop a myocardial infarction (MI). The incidence of missed MIs by the ED is unacceptable and worrisome. In order to overcome these pitfalls, new strategies and ideas are needed.

The differential diagnosis of chest pain is broad and the potential causes range from the benign to the immediate life threatening. It includes ACS, aortic stenosis, myocarditis, pericarditis, aortic dissection, pulmonary embolism, and pneumothorax. These diagnoses necessitate an urgent approach, because a missed diagnosis may be life threatening. Other diseases such as oesophagitis, duodenal ulcer, cholecystitis, pneumonia, gastroenteritis, and musculoskeletal causes are considered benign; however, the latter diagnoses must also be ruled out.

Clinical presentation of an ACS can be categorized as: unstable angina, non-ST elevation MI, and ST elevation MI. After excluding other life-threatening emergencies, risk stratification for ACS is initially made at the bedside, based on coronary disease risk factors, the history, physical exam, electrocardiogram (ECG), and cardiac biomarkers.

The classification of chest pain patients into high, moderate, and low risk for ACS gives the ED physician the opportunity to take immediate action, starting initial treatment, and then transferring them to an appropriate location.

A large number of patients classified as low risk for an ACS, where the history, physical exam, ECG, and cardiac biomarkers are not diagnostic, represent the most problematic and are the most prevalent patients. In order to improve the quality of care, decrease the number of missed ACS, reduce crowding and lengthy waiting in the ED, as well as inappropriate admissions to other departments, new ideas and strategies should be considered in the evaluation of patients with medium and low probability for an ACS. Akin to trauma units, where the systematic approach to patients has dramatically improved the outcomes and reduced mortality, a systematic approach to chest pain patients should be adopted.

In the past several years, chest pain units (CPUs) have been introduced. Following rapid triage in the ED, patients are admitted to fast-track CPUs. These CPUs are intended to evaluate patients with a moderate-to-low risk of having an ACS.

The CPU enables proper monitoring and further real-time evaluation of these patients including repeat ECG tracings and cardiac biomarker blood drawings, as well as additional cardiac evaluations as required, including ergometry, ergometry with cardiac imaging such as nuclear perfusion scanning, stress and dobutamine echocardiography, cardiac computed tomography, and magnetic resonance imaging.

Patients admitted to the CPU should have their evaluation completed within 24 h, to be discharged home safely after reassurance, or to be relocated to the cardiology department for adjustment of medical therapy and coronary angiography.

This unit should be run by a cardiologist (who is best capable for evaluating cardiac patients) and staffed with nurses that are experienced in cardiac monitoring. In view of the nature and function of the CPU, it seems only appropriate that it should be a part of the cardiology department.

This approach has been accepted and has become particularly popular in the USA where more than 100 CPUs are now available, dramatically reducing the hospital admission rate, reducing ED crowding, saving billions of dollars in health-care costs, and most importantly, reducing the number of missed MIs to <0.5–1%.

Every hospital must construct and formulate its CPU protocols in accordance with its own indigenous population, physician experience, financial resources, and hospital space allocation.

There is no doubt that in the last two decades, these CPUs have improved the efficacy, safety, and quality of treatment. Quality assurance and continuous improvement should be an integral part of these CPUs.

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References