Diagnosis of Acute Coronary Syndrome: Scope of the Problem

Warren J. Manning, MD

Beth Israel Deaconess Medical Center and Harvard Medical School, Boston, MA

Acute coronary syndrome (ACS) encompasses a heterogeneous subpopulation of patients presenting with non-traumatic chest pain. In the United States, nearly 6,000,000 patients annually, or nearly 17,000 patients daily present to the Emergency Department with chest pain. Over 1,400,000 are ultimately hospitalized for ACS, making ACS is a common clinical issue for which considerable resources are expended.

ACS itself represents three distinct entities defined by the electrocardiogram and biomarkers, including 1) ST elevation myocardial infarction (STEMI), 2) non-ST elevation myocardial infarction (NSTEMI), and 3) unstable angina. While by definition, only both forms of myocardial infarction are associated with myocardial necrosis, the pathophysiology of all three syndromes are thought to be related, with local inflammation and coronary plaque rupture and thrombus formation a common initiating event. For patients with STEMI, emergent (<90 minute) coronary intervention has been shown to minimize the size of infarction, thereby leading to an improvement in both morbidity and mortality. For those with NSTEMI urgent coronary intervention has been shown to similarly improve prognosis. For those patients without ACS, the burden on the ED physician is to exclude other urgent/emergent causes of chest pain, including aortic dissection or pulmonary embolism, while patients with non-emergent causes of chest pain (e.g., musculoskeletal pain, gastroesophageal reflux) can be safely discharged with follow-up by their primary care physician.

Like most medical disorders, the accurate diagnosis of ACS is dependent on a careful history (including coronary artery disease risk factors-male gender, age, family history of premature CAD, diabetes, smoking, hypercholesterolemia, hypertension), physical examination (appearance, blood pressure, JVP, lung/heart, vascular, extremities) and tests (ECG and blood tests – serum troponin). Despite these tests, over half of the patients admitted for observation due to a concern for ACS are ultimately found to have a non-ACS etiology for their complaint. Still others with ACS are inadvertently discharged and experience adverse events. In the United States, errors in the Emergency Department management of chest pain are currently the #1 cause of malpractice claims. As a result, many patients are unnecessarily admitted to the hospital for evaluation of chest pain – at considerable cost, inconvenience, and morbidity related to unnecessary testing, exposure to hospital microbiology, and medication errors.

Several clinical pathways and risk assessment algorithyms (TIMI Risk Score for UA/NSTEMI) have been developed to assist in the determination of ACS risk and identification of high, intermediate and low risk patients. For patients with inconclusive testing, hospitalization and/or cardiac imaging often play(s) a valuable role in the identification of those with ACS and safe discharge for those with non-life threatening conditions.