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Outcome and Quality of Care of Patients who have Acute Myocardial Infarction

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Because coronary artery disease (CAD) is the number one killer in developed countries, with lifetime prevalence of up to 50% in American men [1], a substantial volume of the medical literature has been dedicated to studying the outcome of this dreadful disease. Multiple life-saving therapies after acute myocardial infarction (AMI) have emerged in the last few decades, backed up by a large number of well conducted studies [2,3], but despite the publication of management guidelines adopting these therapies, appropriate implementation of the guidelines is still less than optimal. Recently, large efforts have been focused on finding means to improve the quality of care (QC) after AMI in an attempt to improve its outcome [4]. This has been accompanied by a gradual shift by the national payers and policy makers toward linking quality performance and outcome to hospital reimbursement and accreditation [5].

This article illustrates the outcome after AMI as related to QC, describes the underuse of evidence-based therapies, and discusses reasons and factors associated with poor adherence to guidelines. It also gives an overview of current quality improvement projects, and some available means to measure and optimize the QC for patients who have AMI.

Outcome after acute myocardial infarction

Despite an aging population, the last 2 decades have witnessed a significant decrease in mortality after AMI [6–11]. In one population, between 1985 and 1995 mortality from CAD fell by 31% for men and 41% for

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women [8]. By 1995, the 28-day case fatality among hospitalized AMI patients was 7% to 10% [8]. A separate study in multiple communities in the United States between 1987 and 1994 measured an overall adjusted 28-day mortality of 10.6% for women and 9.0% for men. The in-hospital mortality fell by 4.1% per year in men and 9.8% per year in women [10]. In an analysis of data of over 1.5 million patients who had AMI enrolled in the National Registry of Myocardial Infarction (NRMI) 1, 2, and 3 between 1990 and 1999, the median duration of hospital stay after AMI decreased from 8.3 to 4.3 days, and hospital mortality dropped from 11.2% to 9.4% [12]. Similar trends were found around the world [6,7]. Most of the observed decrease in mortality can be attributed to increased use of appropriate therapy, including primary percutaneous coronary intervention (PCI) for ST segment-elevation myocardial infarction (STEMI), aspirin, angiotensin-converting enzyme (ACE) inhibitors, and beta blockers, in addition to improvement in risk factor modification through secondary prevention.

Morbidity after AMI remains substantial. Recurrent myocardial infarction occurs in up to 33% of patients, heart failure develops in up to 30%, and stroke in 9% to 13% [13]. Events tend to occur more commonly in women, but this is probably because of the higher age of women presenting with AMI as compared with men [11].

Outcome following AMI varies significantly with the characteristics of the patient at presentation. Poor prognostic indicators include older age, larger AMI, prior AMI, heart failure, anterior AMI, hypotension, tachycardia, baseline risk factors for CAD, elevated cardiac biomarkers, elevated serum creatinine, and ST segment deviation on the electrocardiogram [14–20]. Multiple risk scores have been derived to predict the mortality risk based on these clinical indicators.

Mortality also depends on the type of myocardial infarction. In-hospital mortality has been around 2% in most clinical trials of non-ST segment-elevation myocardial infarction (NSTEMI) [21,22], and 3% to 5% in STEMI [23,24]. In registries, as opposed to clinical trials, in-hospital mortality rates are higher, being around 5% to 7% for NSTEMI and 7% to 9% for STEMI [25–29]. The high likelihood of receiving optimal medical care and the exclusion of high-risk patients in most trials contribute to the lower mortality rate in patients enrolled in clinical trials when compared with registries [30].

In contrast to the short-term outcome, long-term mortality is higher after NSTEMI than after STEMI. In the GUSTO-IIb trial, 1-year mortality was 11.1% in NSTEMI and 9.6% in STEMI [31]; the 2-year mortality was 20% for NSTEMI and 11% for STEMI in a community-based observational study [32]. The likely explanation for this discrepancy is that patients who have STEMI have larger infarcts, and thus worse immediate outcome, whereas NSTEMI patients often have a higher risk profile, higher incidence of multivessel disease, a greater likelihood of residual ischemia, and thus worse long-term outcome [31,33,34]. This underlines the importance of secondary medical prevention to improve survival in AMI patients.