EDITORIAL COMMENT

We Have Journeyed Far*

Ileana L. Piña, MD
Philadelphia, Pennsylvania

It is well to acknowledge the debt which we every-day practitioners owe to the great leaders and workers in the scientific branches of our art. We dwell too much in corners, and, consumed with the petty cares of a bread-and-butter struggle, forget that outside our routine lie Elysian fields into which we may never have wandered. . . .

Sir William Osler, 1891

The article by Goldberg and colleagues found in this issue is a meticulous history of the changes in incidence and in-hospital and long term case fatality rates of myocardial infarction (MI) for a defined New England community from 1975 to 1995 (1). The authors suggest that there is a decline in the incidence of acute MI as well as in the short term and one-year mortality in survivors postdischarge. In the current era of thrombolysis, polypharmacy and ever-shorter hospital stays with tighter allocation of resources, it is easy to forget how far we have come in the treatment of MI. It is equally easy, however, to envision where we should be in the new millennium. Nonetheless, Goldberg et al. invite us to recall the advances made in the treatment of the acute MI from 1975 to the present and to encourage reflection on future directions (1).

See page 1533

Mortality. In 1962, when coronary care units were developed, the short-term mortality for MI was 30% to 40%, with 40% due to arrhythmic deaths (2–4). The groundwork for coronary units had already begun when in 1960 Zoll published a description of externally applied countershock to terminate lethal ventricular arrhythmias and Kowenhouven introduced closed cardiac massage, which was the beginning of modern cardiopulmonary resuscitation (5,6). The ability to treat acute arrhythmias facilitated the development of sophisticated monitoring equipment and allowed the proliferation of coronary care units both in the U.S. and abroad (2,3). In Day’s initial coronary care unit, the mortality of the first 62 patients had already decreased to 19%. Many, however, continued to succumb to ventricular arrhythmias, even in coronary units. Subsequently, in 1967, Lown and associates reported that the use of prophylactic intravenous lidocaine decreased the occurrence of primary ventricular fibrillation (4). Thus, the era of prevention of ventricular fibrillation began. From 1967 to 1971, the mortality rates for MI treated in coronary units ranged from 12% to 25%, particularly in patients without severe congestive heart failure (7,8). Coronary units had become primarily areas to monitor arrhythmias closely and treat them promptly.

In 1967, the use of coronary care units became expanded to include the “rule-out myocardial infarction” patients after Lown and colleagues stated that if admission were delayed until a diagnosis was firmly made, then “a significant number of patients will succumb to preventable electrical death” (9). As the selection of patients to coronary care units became less stringent, and the dynamic evolution of infarction became known, specialists began to study interventions to limit infarct size. In the late 1970s, the medical community started to recognize that the size of the infarct was directly related to the development of congestive heart failure or cardiogenic shock. Methods proposed to limit infarct size included beta-adrenergic blockers, nitroglycerin, surgical revascularization and the use of balloon counterpulsation, among others (10–13).

This brief chronicle now brings us to the early decade described by Goldberg et al. (1). The crude in-hospital case fatality rate in 1975 to 1978 was somewhat better than that described in 1970 (24% vs. 17.8%) when compared to the Minnesota Heart Survey and comparable to the 1985 figures (14% vs. 14.9%) for the period of 1981 to 1984 (14). Both the Minnesota Heart Survey and the current report by Goldberg are population-based studies, all-inclusive, and do not select out the more complex patients as is often the case in clinical trials (1,14). Thus, there is merit in assessing and reviewing the influence of therapies on the general population.

The earlier years (1975 to 1978 and 1981 to 1984) could truly be called the prethrombolytic period. It is interesting to remember that in 1981, the cardiology community was still debating whether coronary thrombosis was primary or secondary in acute infarction, although by then, DeWood et al. had demonstrated that in 90% of infarct-related arteries there was complete occlusion and Rentrop had reported reperfusion of the infarct related artery in over 75% of patients within the first 3 h of chest pain (15–17). These facts are even more amazing when one considers that visionaries such as Sherry and Fletcher had in 1958 and 1959 described the use of streptokinase in a small group of patients with acute MI with an encouraging lower mortality in the absence of major systemic toxicity (18,19). Subsequent major trials showed reduction in mortality using reperfusion early in the evolution of MI (20). For the first time, physicians became convinced that infarct size could be limited, and thus, the era of thrombolysis had begun.

*Editorials published in Journal of the American College of Cardiology reflect the views of the authors and do not necessarily represent the views of JACC or the American College of Cardiology.

From the Department of Cardiomyopathy and Cardiac Rehabilitation, Temple University, Philadelphia, Pennsylvania.
Although the in-hospital mortality data of Goldberg and associates is not as low as is reported in controlled clinical trials, the definite decline in the fatality rate is worthy of note. As duly observed by the authors, population studies do not control for differences in treatment strategies. Much of the decline in mortality can be attributed to the use of thrombolytic agents in addition to other therapies such as ACE inhibitors, beta-adrenergic blocking agents and anti-platelet agents.

Now that mortality rates as low as 4% have been reported, where do we progress from this point (21)? In the ideal world, there should be no “treatment gap.” For example, therapies proved to be life-saving should be applied to all eligible patients. The “treatment gap”, however, does exist. In 1996, the joint Committee on the Management of Acute Myocardial Infarction of the American Heart Association and the American College of Cardiology recommended that thrombolytic therapy be administered to all patients regardless of age, gender or race who have symptoms suggestive of an acute MI and who present within 12 h of onset of symptoms (22). Furthermore, in patients with an increased risk of bleeding, primary angioplasty or bypass surgery should be considered. In spite of these recommendations, the elderly and women are less likely to receive thrombolytic therapy in addition to patients with a past history of heart failure or who have a bundle-branch block on initial ECG. In fact, up to 24% of patients who are eligible for this therapy do not receive it (23–25). In the population of inclusive inclusions in Worcester, the percent of patients receiving thrombolytics was only 29% to 30%, and did not significantly change from 1990 to 1995 (1). Efforts must continue to close the gap between the randomized trials and clinical practice. The reduction in cardiovascular mortality needs to be extended to women, the elderly and those at highest risk for in-hospital mortality. This should be one of the directions toward mortality reduction in the next millennium. Furthermore, as underscored by the findings of Goldberg et al., the use of angiotensin converting enzyme inhibitors increased from 1990 to 1995 (1). However, data from the National Registry of Myocardial Infarction have observed that most high-risk patients are not receiving ACE inhibitors, because only 26% of patients with an anterior wall MI were discharged on this treatment (26). The numbers are nearly identical to those of Goldberg et al. (1).

Incidence. The life-saving interventions discussed here would not be necessary if the incidence of MI were significantly reduced. The reported decreases in the incidence of MI in Worcester, Massachusetts are indeed encouraging and mirror other reports of population studies (1,27). Nadir of the decline occurred in the late 1980s with subsequent increases in incidence in 1991, 1993, and 1995 that were not as high as in the earlier decade. Although one would hope that greater awareness of blood pressure level, cholesterol measurements and the risks of smoking are responsible for the decline, other risks, such as obesity and inactivity continue to rise in the U.S. It is most interesting to note that the percent of patients with an antecedent history of hypertension and diabetes rose from 1975 to 1995. Thus, the presence of two highly significant risk factors has not diminished. The observations of these investigators emphasize the need for continued primary prevention and national efforts to curb smoking, a focus on obesity and the physician’s role in blood pressure and lipid control. Programs at the local community level should be developed to encourage physical activity.

Finally as encouraging as these data may seem, the rate of hospitalizations for heart failure have been increasing during the same two decades, particularly in the elderly (28). Because coronary artery disease is the most common cause of heart failure in the U.S., one hopes that the clinical application of the treatment trials, i.e., use of thrombolytics, antiplatelet agents, beta-adrenergic blockers and ACE inhibitors in conjunction with aggressive primary and secondary prevention programs will eventually decrease the incidence of heart failure as well (29). In summary, the “treatment gap” needs closure.

REFERENCES

14. Burke GL, Sprafka JM, Folsom AR, Luepker RV, Norsted SW, Blackburn H. Trends in mortality, morbidity and risk factor levels...