

EDITORIAL COMMENT

Increasing Post-Myocardial Infarction Heart Failure Incidence in Elderly Patients

A Call for Action*

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The impact of heart failure on the global health care community has long been recognized. Ischemic heart disease is a major cause of heart failure. In the last 30 years there have been dramatic advances in the management of ischemic heart disease in general and acute myocardial infarction (MI) specifically. Although the risk of dying of acute MI and coronary artery disease has declined, the mortality rate from congestive heart failure (CHF) has declined to a much lesser extent (1,2). The number of hospitalizations with CHF as either the principal or the secondary diagnosis in patients over the age of 65 years has actually increased by 70% to 100% over the last 25 years (3).

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One possible explanation for this increase is that the patients who are now surviving the acute MI are subsequently succumbing to the consequences of the MI. The study by Ezekowitz et al. (4) in this issue of the *Journal* makes an attempt to investigate this further. The investigators followed up a cohort of patients over the age of 65 years who presented with a first MI over a 6-year period in Alberta, Canada. They determined the outcomes of the acute hospitalization in terms of whether the patients survived the hospitalization and whether they had the diagnosis of CHF. In addition to events during the initial hospitalization, the investigators followed up the patients over a period of 5 years to determine whether they died and also whether CHF developed. The data were obtained from administrative databases and were quite complete in terms of determining the vital status of the patients, but were

admittedly less complete in terms of the cause of death and other important cardiovascular variables such as left ventricular (LV) ejection fraction, presence or absence of ventricular tachyarrhythmia, or whether the index event was a ST-segment elevation or non-ST-segment elevation MI. The diagnosis of CHF during the index admission or subsequently was made by using insurance claims using the International Classification of Diseases-9th Revision codes for CHF. Although this method of diagnosing a complex condition such as CHF could certainly be questioned, there are data to suggest that it does correlate well with chart review methods (5), although if there is an error, it is likely that the diagnosis of CHF was under-reported (6). Even with these significant limitations, the investigators are to be congratulated in collecting and analyzing data on such a large number of consecutive patients treated in a real-world practice. The most important finding of this analysis was that during the study period from 1994 to 2000, there was a significant decrease in the mortality rate from the first MI, but at the same time there was an increase in the rate of CHF developing from that hospitalization on. Perhaps the most surprising finding of the investigation was that the percentage of patients in whom CHF developed within 5 years of the index event was 76% and that the 5-year mortality rate in these patients with CHF was 39.1%, which is much higher than the 26.7% mortality rate in those patients in whom CHF did not develop. Given this very high incidence of CHF in the population, it is appropriate for clinicians to ask what if anything can be done to reduce it.

Because it is an observational study, the investigators cannot really explain the basis of the findings and the reader must take care in interpreting such findings as establishing mechanisms of disease. Such a study does, however, raise many questions and hypotheses that should be examined further. The 2 interventions that were associated with a decrease in mortality caused by acute MI were the use of appropriate medical therapy such as beta-blockers, angiotensin-converting enzyme (ACE) inhibitors, and statins, and also early coronary revascularization. It is a reasonable hypothesis that interventions that limit infarct size such as timely reperfusion therapy would likely reduce the development of CHF. In this cohort of patients, only a minority of the patients underwent invasive revascularization during the index MI. It is certainly possible that if there were greater utilization of rapid reperfusion in these patients, there would be a lower incidence of subsequent heart failure. This speculation is supported by data from the same investigators that in an unselected population with MI, the use of invasive coronary revascularization was associated with a reduction in the risk of subsequent development of heart failure and that this finding persisted after adjustment for other risk factors for heart failure including advanced age (7). It is likely, however, that many of these patients did not in fact have significantly reduced LV systolic function,

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especially given the high incidence of heart failure with preserved systolic function in this elderly population (8,9). In this case, coronary reperfusion may not result in dramatic decreases in the incidence of heart failure. Lack of LV systolic function measurements hampers interpretation of the data in the study by Ezekowitz et al. (4). A randomized trial would be needed to answer this question directly.

The use of statins and beta-blockers were associated with a reduced incidence of heart failure as well as a reduced mortality. This is certainly consistent with what we know about the effects of beta-blockers in patients with established CHF as well as asymptomatic LV dysfunction. The effect of statins, however, is not as well established. The effectiveness of statins in elderly patients with CHF is not clear, with recent studies suggesting a lack of effect (10). The lack of effect of ACE inhibitors on the development of CHF is somewhat perplexing, especially if one postulates that LV dysfunction is the primary cause of CHF. This also raises the question of whether much of the CHF that occurred in this patient population did so in the presence of relatively well-preserved systolic function, in which case the benefit of ACE inhibitors is less well established (11,12).

An issue that is not addressed in this study is that of the use of automated implantable cardioverter-defibrillators (AICDs) in this high-risk population. In the absence of data on ventricular function, one cannot be certain of what percentage of patients may have qualified for defibrillators, and the study did not include AICD usage. Having said that, aggressive use of defibrillators probably would not have changed the conclusions significantly. It is unfortunate that the databases in Alberta, Canada, did not allow the investigators to determine the modes of death. Thus, it is not possible to know the percentage of patients who died suddenly, presumably from arrhythmic death, versus those from progressive heart failure or from re-infarction/ischemia. National databases probably should be amended to include more pertinent data so that the clinical outcomes could be analyzed more intelligently.

So what can the practicing physician take away from this study? Certainly it is clear that an MI is very significant event in this population, not only in terms of short-term mortality, but also a marker of poor long-term prognosis. In this population, even what would otherwise be considered as a low-risk MI should be viewed, in the terms of the authors, as a "sentinel event," prompting early recognition of the risk and hopefully strategies to reduce that risk. We can feel relatively confident that adherence to evidence-based practice will improve short-term prognosis and will likely improve longer-term prognosis. There does seem to be a difference in the use of evidence-based strategies in the elderly population compared with the younger population (13). This study by Ezekowitz et al. (4) does suggest that closer adherence to evidence-based strategies in this population may improve the long-term outcome after first MI. More work will need to be done to determine that mechanism behind the high incidence of heart failure in this

population, and once that has been more clearly ascertained, strategies to alter the risk can be rationally designed.

An area that will need to be examined in this elderly population in particular is cost. This is likely to be rather contentious, but given the numbers of patients that are being considered, one could certainly question the frequent use of high-cost interventions such as defibrillators and invasive revascularization in this population. Although elderly was defined as older than 65 years for the purpose of this study, we are more frequently seeing patients presenting in the 8th and 9th decades of life, and such patients may well need to be considered differently from the younger elderly patients. Data on the response of such very elderly patients to these types of interventions are sorely lacking. What little data there are seem to suggest that it is in such patients at high risk that the benefit may be greatest (13). In the absence of clear-cut data supporting one strategy, and because the data are unlikely to be forthcoming soon, clinicians will need to continue doing what we should have done until now: make decisions based on individual patient presentations, presenting all information to the patient including what we think the risks are of intervening or not intervening, and then making the decision with the active participation of the patient (14). It is probably not good practice to set arbitrary age limits on the appropriateness of the various interventions; however, given the rapidly advancing age of our general population and the precariousness of the national economic situation, such discussions are likely to occur, and it will be incumbent on us as physicians to have as much information as possible; careful analysis of data such as was done in this study is a good beginning.

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