Early hospital discharge after uncomplicated myocardial infarction: are further improvements possible?

Daniel B. Marka*, L. Kristin Newbyb

aOutcomes Research and Assessment Group, Duke Clinical Research Institute, Durham, NC USA
bDuke Clinical Research Institute, Durham, NC USA

Received 14 July 2003; accepted 14 July 2003

See doi:10.1016/S1095-668X(03)00308-7, for the article to which this editorial refers

Early hospital discharge after uncomplicated acute myocardial infarction (MI) has been a focus of substantial clinical and research interest for over 25 years. Length of stay for acute MI, as for most medical conditions, is more a product of historical precedent than medical evidence. The search for ever shorter hospital stays is motivated by a desire of health care payers to save money and is supported by the belief that some fraction of the conventional hospitalization represents inefficient, ‘flat of the curve’ medical care. In other words, care with no measurable incremental clinical benefit but considerable incremental expense. In a recent analysis, for example, we estimated that extending the hospital stay beyond day 3 for uncomplicated acute MI patients saved an additional 0.006 years of life per day.1 The corresponding cost per year-of-life saved was over US$100 000. Adding impetus to this efficiency argument for shortening hospital stays is the growing awareness that, in 2003, hospitals are not necessarily safe places to stay. Medical errors, particularly pharmaceutical errors, are reported to be a common and sometimes fatal consequence of being hospitalized.

However, the balance sheet for hospitalization is not all negative. While there have been some experiments in the UK with home care for lower risk MI patients, prompt use of reperfusion therapy and detection and treatment of potentially fatal arrhythmias are still best accomplished in an inpatient monitored facility. In addition, there is now solid randomized trial evidence supporting a regimen of secondary prevention for acute MI survivors that typically includes antiplatelet agents, statins, beta blockers, and ACE-inhibitors.2 Converting smokers to non-smokers is also felt to provide significant prognostic benefit, and the fresh experience of an MI may provide the impetus the patient needs to decide to quit. Further, many centres perform some form of risk stratification testing before discharge and higher risk patients may require revascularization to improve their prognosis. In short, there is much to be accomplished during the modern hospitalization for acute MI both to ensure short-term safety and to initiate a regimen of therapies to improve long-term outcomes.

How long to hospitalize the uncomplicated acute MI patient from a short-term safety perspective depends on the answer to two questions: (1) When does the risk of life-threatening complications fall to an acceptably low level? (2) What is the most efficient strategy to define when the requisite low-risk state has been reached? Evidence to address the former question comes primarily from analyses of large observational databases. In studies of acute reperfusion therapy, that level of risk appears to be achieved after 72 h of an uncomplicated course.3 Supporting evidence comes from international comparisons of discharge times after acute MI, which demonstrate that marked differences in length of stay have no evident benefits on 30-day survival or event rates.4 In aggregate, these data suggest continuing significant inefficiency in post-MI length of stay, but no evidence for improved outcomes with lengths of stay greater than 72 h for carefully chosen low-risk patients.

The other major short-term safety question about early discharge strategies is how to establish efficiently that patients are sufficiently low risk to go home. Given the importance of this question and the frequency with which it arises in daily practice, it is startling to reflect that there have only been four relatively small randomized trials of early discharge strategies since the advent of reperfusion therapy in acute MI, the most recent of
which appears in this issue of the Journal. Probably the major reason for this deficiency is the very large sample size required to show that an 'early discharge' strategy has safety equal to a 'routine hospital stay' strategy.

Published investigations have used various combinations of data from the early clinical course and the results of angiography and stress testing to define a low-risk subset for early discharge. Topol and colleagues randomly assigned 80 patients who had an uncomplicated clinical course and no provocable ischaemia on exercise testing to day 3 discharge vs conventional discharge. In the second Primary Angioplasty in Myocardial Infarction (PAMI-II) trial, 471 low-risk patients based on age (≤70) and results of cardiac catheterization (1- or 2-vessel coronary disease, successful coronary angioplasty of the infarct vessel, ejection fraction >45%) were randomized to day 3 discharge vs traditional care. Both studies found equivalent medical outcomes out to 6 months and lower costs in the early discharge arm. The Quebec Heart Institute Trial randomized 120 low-risk MI patients to a short stay (3.5 days) versus standard stay (6.9 days) using clinical criteria and predischarge 3 channel 24-h ambulatory monitoring, during which patients walked up and down two flights of stairs. One week after discharge, patients underwent a symptom-limited Bruce protocol treadmill. Adverse events and readmissions were equivalent out to 6 months in the two groups, and the short-stay group had 25% fewer invasive procedures.

In the Cost of Strategies After Myocardial Infarction (COSTAMI) study, reported in the current issue of the Journal, 458 uncomplicated MI patients with preserved left ventricular function (ejection fraction >40% on day 3) enrolled at eight hospitals in Italy and two in Turkey were randomized within 72 h of symptom onset to pharmacologic stress echo (on day 4) and immediate discharge with a negative result (early discharge strategy) vs usual care. The latter strategy involved no predischarge stress test and a symptom-limited exercise ECG 2–3 weeks after discharge. Median length of stay was 6 days in the early discharge arm and 7 days in the usual care arm. At 30 days, the early discharge arm had four deaths and five reinfarctions, while the usual care group had two deaths and five reinfarctions (P=ns). At 1 year, there was still no difference in deaths or reinfarctions and also no difference in recurrent chest pain requiring readmission. Interestingly, despite the different initial risk stratification strategy employed in the two arms, the rate of angiography was virtually identical both at initial hospital discharge (13%) and out to 1 year (41–42%). The authors concluded that early use of stress echo allows a safe accelerated hospital discharge, while lowering the costs of caring for uncomplicated acute MI patients. The investigators are to be congratulated for conducting a careful randomized trial in a challenging area.

Compared with prior studies, the present study differs in the time to discharge of the accelerated discharge arm and the type of risk stratification testing used. 'Early discharge' in this study was 6 days. Given that the goal of the experimental arm was discharge on day 4 immediately after a negative stress echo, one presumes that administrative barriers prevented discharge at the targeted time. In the PAMI-II study, angiography was used to eliminate the need for predischarge stress testing. In the Quebec Heart Institute Trial and the COSTAMI study, a non-invasive test was used to guide the selective use of angiography. Ambulatory monitoring in conjunction with stair walking in the Quebec Trial was associated with a lower rate of angiography while stress echo in the COSTAMI study had no effect on management relative to post-discharge exercise testing. While comparative data for different testing strategies is lacking in this context, there is little reason to conclude that any of the tested strategies is clearly superior. Further, the details of the testing appear to be less important than the clinical screening to define candidates for early discharge.

So with several options to identify patients for early discharge and reasonable indication that properly identified patients will not be harmed by such management, why are more patients not being discharged on day 4? In the GUSTO III trial of t-PA vs rPA, for example, over 60% of enrolled patients in Europe were eligible for discharge after 72 h according to previously derived criteria, but less than 2% were actually discharged in that time frame. Several reasons may be posited. First, a significant proportion of medically eligible patients may not be suitable for other reasons. In the Quebec Trial, of 525 consecutive acute MI patients, 23% were judged medically eligible for early discharge. An almost equivalent number (20%) were judged ineligible because of non-medical issues, such as patient living alone or having suboptimal comprehension of the post-discharge regimen, and an additional 9% had concomitant medical problems requiring additional care. Second, as alluded to earlier, there is much to be done in the management of acute MI and many institutions do not have systems in place to ensure that these tasks can be accomplished with maximal efficiency. While it is possible to shift a significant portion of these tasks to the outpatient setting, the seamless continuity and co-ordination of care required is currently lacking in most health care systems. However, if these tasks can be performed equally well in the inpatient and outpatient setting, there is little logic for preferring the more expensive inpatient venue. In the area of heart failure management, innovative outpatient disease management programs have improved quality of care and reduced re-admissions and costs. In our opinion, the next phase in the development of early discharge strategies should focus not on which test to do, rather on setting up and testing outpatient systems to improve quality by ensuring that these patients are started on and adhere to the appropriate risk modifying therapies. Demonstrating the effectiveness and economic attractiveness of such programs in conjunction with a very focused and brief hospital stay will help advance our ultimate goal of returning the patient to as normal a life as possible.

References


