**Editorial Comment**

**Emergency Percutaneous Transluminal Coronary Angioplasty in Patients With Early Acute Myocardial Infarction***

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The use of emergency percutaneous transluminal coronary angioplasty as primary therapy in patients with early acute myocardial infarction, as detailed in this issue of the Journal by Rothbaum et al. (1), is an important report of an aggressive procedure expertly and expeditiously applied. It is a tour de force of this invasive methodology with impressive clinical results. These results are difficult to compare with those of other modes of therapy; nevertheless, it is our duty as clinicians to try to put them into some meaningful context. Such aggressive management has compelling logic and there are substantial supporting experimental data documenting benefit from early reperfusion. It is unfortunate but true, however, that many newer methods of therapy are often compared with essentially no treatment rather than with successive levels of progressively more active pharmacologic therapy.

No prospectively randomized or retrospectively matched control group was designed into this trial. Furthermore, it is not clear from the report how many patients, if any, who presented early to St. Vincent’s Hospital with acute myocardial infarction in this 37 month period did not receive emergency angioplasty. No one was excluded for age, cardiogenic shock or even ongoing cardiac arrest, but any other exclusions that would help to define a suitable comparison group are not specified, if they occurred.

**Comparison with GISSI trial.** The results in these 151 patients can be compared with the overall mortality as reported by the large Italian study (GISSI) (2) of intravenous streptokinase versus "standard" coronary care unit therapy. That study includes the largest number of patients with early myocardial infarction studied so far (11,806 patients randomized) and shows a definite advantage for streptokinase over ill defined but "standard" therapy. The GISSI mortality rate in patients treated within the first 3 hours of acute myocardial infarction was 9.2%, and this compares favorably with the overall mortality rate of 8.6% presented by Rothbaum et al. Some of the patients studied by Rothbaum et al. were treated after that 3 hour period, but the majority of these had patent vessels at the time of treatment and perhaps would have followed a favorable course without intervention. Randomization in the Italian study began after admission to the coronary care unit. This delay as well as protocol restrictions for use of streptokinase may well have eliminated the patients with early acute arrest who represent 4 of the 13 deaths in the series of Rothbaum et al. When these patients are excluded, the mortality rate for emergency angioplasty falls to 6.1% in this small series. If, however, there were any reason to believe that transportation to the catheterization laboratory and preparation for angiography had a role in precipitating the cardiac arrest in any of these patients, then of course their death would have to be considered angioplasty related.

**Comparison with MIAMI trial.** Another group receiving less aggressive therapy can be found in the MIAMI trial (3). In that study 2,877 patients received intravenous metoprolol a mean of 6.8 hours into an acute myocardial infarction. The 15 day mortality rate in the treated group was 4.3%. There were numerous exclusions in that trial, however, including all patients who had congestive heart failure, cardiogenic shock or cardiac arrest or who had previously received either a beta-adrenergic or a calcium channel blocking agent. Those exclusions probably define a lower risk subgroup than that of the patients studied by Rothbaum et al.

**Comparison with emergency coronary bypass trial.** Another approach, which might be considered even more aggressive than that of emergency angioplasty, is the use of emergency coronary artery bypass surgery as reported by the Spokane group (4). Their overall mortality rate for 440 patients operated on emergently for acute myocardial infarction was 5.2%. Among the 291 patients who were operated on within the first 6 hours of infarction, however, the mortality rate was 3.8%. The surgeons at Spokane did exclude patients <40 or >65 years and patients who were judged by their managing physician to be "too ill" to undergo emergency surgery. Nevertheless, in that select population, an unusually talented and dedicated group of physicians have achieved a mortality for the management of acute myocardial infarction that is extremely admirable, although clearly difficult to replicate at other institutions.
Unstable angina. In all of these series, early aggressive therapy may well have included management of some patients who actually had severe unstable angina (formerly classified as the intermediate coronary syndrome) and whose condition might never have evolved into acute myocardial infarction. Such patients cannot be distinguished by current techniques from patients in the early phase of infarction. Obviously the most successful therapy will result in no infarction, and waiting to see whether true infarction will develop would result in loss of the most valuable time period for intervention. Such uncertainty reinforces the need for a contemporaneous control group in evaluating alternative therapies.

Economic implications. The study of Rothbaum et al. needs to be taken very seriously in another context, that of the overall economics of such aggressive treatment. The American people deserve the best of care delivered in the most efficient manner and at the least possible cost. If we conclude that aggressive management, either with primary emergency angioplasty or emergency bypass surgery, is clearly the best method of treating patients with early myocardial infarction, then we need to establish a referral system for rapid transfer or even in-transport ambulance rerouting to a centralized treating facility to manage these patients. The current network for handling major trauma cases is an obvious model. To have cardiac catheterization laboratories with expert angiographers and cardiovascular surgery backup in every local hospital constantly ready just to treat the occasional patient with acute myocardial infarction who appears very early in his or her course would be extremely costly, inefficient and probably dangerous. These facilities will have to be concentrated where expertise is constantly available. Because of increased volume, the skills of the angiographers would likely be optimized and the unit cost per procedure should be minimized.

Clinical implications. Rothbaum et al. clearly show that emergency primary percutaneous coronary angioplasty is efficacious for the management of patients with acute myocardial infarction who present early to a tertiary care center possessing a high level of angioplasty expertise. Before we establish emergency primary angioplasty as the reference standard and gear up to provide it nationwide, we need to know from a large scale randomized controlled trial that emergency angioplasty alone is clearly superior to either angioplasty or coronary bypass surgery performed as a staged procedure after initial reperfusion by thrombolytic therapy in a local hospital.

References