tional measures, many of which are costly, should be used only in those instances when standard pharma-
cotherapy and standard supportive therapy have been given, have been maximized, and have clearly failed by objective parameters.

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The Importance of Rapidly 
Treating Patients With Acute 
Myocardial Infarction

Thrombolytic therapy has dramatically reduced mortal-
y following acute myocardial infarction (MI). Its benefit is due to early achievement of infarct-related artery patency: Rapid reperfusion limits infarct size, decreases left ventricular dysfunc-
tion, and improves survival,1,2 with a time window of efficacy extending to patients treated within 12 h from the onset of pain.3

Time is a crucial factor in acute MI: earlier treat-
ment with thrombolysis can reduce mortality.3,9 As shown in Table 1, mortality is lower in patients treated early after the onset of symptoms compared with later treatment. In the Gruppo Italiano per lo Studio della Streptochinasi nell'Infarto Miocardico

<table>
<thead>
<tr>
<th>Study</th>
<th>Early Time to Treatment Mortality, %</th>
<th>Later Time to Treatment Mortality, %</th>
</tr>
</thead>
<tbody>
<tr>
<td>GISSI-1*</td>
<td>8.2</td>
<td>11.0</td>
</tr>
<tr>
<td>Control</td>
<td>15.4</td>
<td>12.6</td>
</tr>
<tr>
<td>MITI#</td>
<td>1.2</td>
<td>8.7</td>
</tr>
<tr>
<td>TMI-II¶</td>
<td>3.2</td>
<td>5.2</td>
</tr>
<tr>
<td>EMPI§</td>
<td>9.7</td>
<td>11.1</td>
</tr>
</tbody>
</table>

*Data are in-hospital mortality; early time to treatment is <1 h; later time to treatment is between 1 and 12 h.
#Data are in-hospital mortality; early time to treatment is <70 min; later time to treatment is between 70 min and 3 h.
¶Data are 42-day mortality; early time to treatment is <1 h; later time to treatment is between 1 and 4 h.
§Data are 30-day mortality; data for early time to treatment are prehospital treatment (mean delay 150 min); later time to treatment is hospital-initiated treatment (mean delay 190 min).

(GISSI) 1 trial, patients treated with thrombolysis within 1 h of symptom onset had a 50% improvement in mortality compared with placebo.4 In the Myo-

Cardiac Infarction Triage and Intervention (MITI) prehospital trial, in which essentially all patients were treated within 3 h of symptom onset, mortality was only 1.2% in patients treated within the first 70 min compared with 8.7% for those treated between 70 min and 3 h (p=0.04).5 The Thrombolysis in Myo-

Cardiac Infarction (TIMI) II trial found that for each hour earlier that a patient was treated with throm-

bolytic therapy, there was a decrease in the absolute mortality by 1%.6,7 A similar association between lower mortality and earlier treatment was observed in patients treated with primary angioplasty.8,9 Thus, time is an important adjunct to thrombolytic therapy.

To reduce time to treatment, it is useful to examine 
the components of the time delay in actually achieving coronary reperfusion. These can be di-
vided into four phases: (1) patient delays, i.e., the time between the onset of symptoms and the seeking of medical attention; (2) transport delays; (3) the so-called “door-to-needle time,” the interval between the patient’s arrival at the medical facility and initiation of thrombolytic therapy; and (4) thrombolysis reperfusion time, the time between the administra-
tion of thrombolytic therapy and the achievement of reperfusion.10

To reduce time to treatment, the National Heart, Lung, and Blood Institute established the National Heart Attack Alert Program (NHAAP). Its objective is to reduce the mortality from acute MI through 

rapid identification and treatment of patients with symptoms of acute MI.11 To improve patient-related 
and transport delays, the NHAAP is studying ways to 
best implement broad-based public awareness cam-
paigns and has prepared guidelines for better com-
munication between emergency medical technicians and hospitals as well as improved emergency call (911) response systems.\textsuperscript{12}

Critical care physicians can play a major role in reducing the third component of delay, the “door-to-needle” time. Currently, time delays are far too common.\textsuperscript{13,14} The NHAAP has developed a standardized protocol designed to streamline the approach to acute MI patients, focusing on the essential parts of the history and evaluation that are needed for administration of thrombolysis.\textsuperscript{12}

Over the past year at our institution, we have implemented such an acute MI protocol. For patients presenting to the Emergency Department with possible infarction identified by a triage nurse, the patient is rapidly moved into an “acute” room, and an electrocardiogram is obtained. The electrocardiogram is given immediately to the attending physician for interpretation. If ST segment elevation is present, and the onset of pain is within 12 h, the physician assesses the patient for possible contraindications to thrombolytic therapy. In parallel with this assessment, the cardiologist on call is paged to assist in decision making, although treatment is not delayed for the cardiologist’s arrival. If no contraindications are present, the thrombolytic agent is prepared at the bedside and administered as quickly as possible. If contraindications are present, or if the patient is in cardiogenic shock, primary angioplasty is considered as the means of reperfusion therapy. The use of other important adjunctive agents, such as aspirin, heparin, or beta-blockers, is also begun as quickly as possible. Since using this approach, we have observed a significant reduction in our door-to-needle times, from 76 min in the 6 months before adopting the protocol, to 48 min after its implementation (p=0.045).\textsuperscript{11} It is hoped that the use of a standardized protocol in other hospitals will also speed treatment and thereby improve survival of patients with acute MI.

The importance of time is further supported by the recent findings that a more aggressive thrombolytic regimen, front-loaded tissue plasminogen activator, which achieves a higher rate of early reperfusion, is associated with improved survival.\textsuperscript{5,15,16} Furthermore, it appears that the benefit achieved from reducing each of the four components of time delay (patient, transport, door-to-needle, and drug reperfusion times) are additive in improving survival.\textsuperscript{5,15,16}

The American College of Chest Physicians (ACCP) has a long history of working with its membership to promote advances in critical care and of implementing guidelines developed from emerging clinical trial data. The ACCP has supported the NHAAP over the past 3 years in developing these guidelines for the treatment of patients with acute MI and now needs to encourage their use. As ACCP representatives to the NHAAP, we as cardiologists and critical care physicians wish to highlight the importance of these new guidelines and suggest that ACCP members review the NHAAP recommendations and work at their respective institutions to implement these important guidelines. Hopefully, critical care physicians, cardiologists, internists, emergency medicine physicians, and nurses will continue to work together to develop additional interdisciplinary strategies to reduce time to treatment, thereby improving the survival of patients with acute MI.

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To obtain reprints of National Heart Attack Alert Program articles, contact the National Heart, Lung, and Blood Institute Information Center, P.O. Box 30105, Bethesda, MD 20824-0105, or call 301-251-1222.

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