

K.A. Eagle, S.G. Goodman,  
Á. Avezum, A. Budaj,  
C.M. Sullivan, J. López-Sendón,  
for the GRACE Investigators  
University Hospital,  
Division of Cardiology,  
Ann Arbor, Michigan, USA

Lancet 2001 (in press).

## Practice variation and missed opportunities for reperfusion in ST-segment elevation myocardial infarction – findings from the Global Registry of Acute Coronary Events (GRACE)

Early reperfusion therapy with primary PCI or fibrinolytics has been shown to reduce the mortality rate in patients with AMI, and is advocated as the standard of care by the American Heart Association, ACC and ESC.<sup>1,2</sup> Despite guidelines and abundant evidence that support its use, approaches to reperfusion therapy still vary greatly, and many eligible patients fail to receive any form of reperfusion.<sup>3,4</sup>

GRACE is an ongoing, multinational, observational study of patients hospitalized with the full spectrum of ACS. In this study, we reviewed current practices in reperfusion therapy of patients with STEMI from four continents using unselected data from GRACE. The analysis focused on patients who presented within 12 hours of the onset of symptoms.

### Results

Of the 9251 patients enrolled in GRACE, 2501 (27%) were diagnosed with STEMI. The type of reperfusion therapy that these patients received is shown in Figure 1.

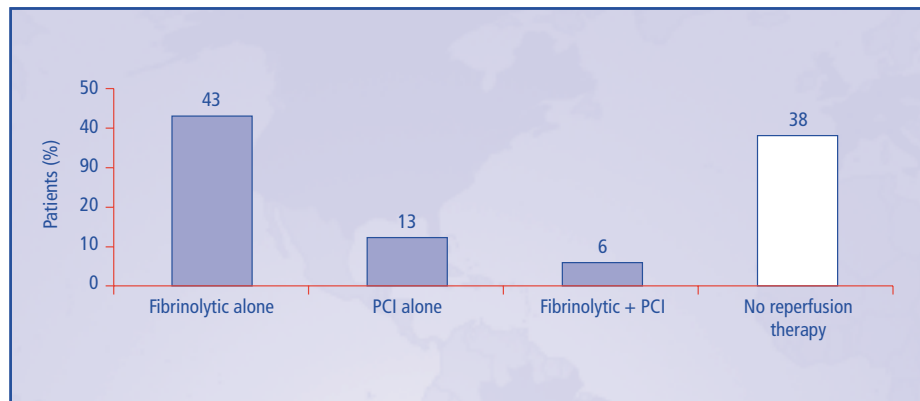
There are substantial geographic variations in the type of reperfusion strategy used, and up to one-third of patients do not receive any form of reperfusion (Table). The most common use of fibrinolytic therapy alone was reported in Australia, New Zealand and Canada, and the least common use was reported in the USA. Primary PCI was performed in nearly 20% of patients in the USA,

compared with only 1% of patients in Australia, New Zealand and Canada. The highest rate of rescue therapy, involving both fibrinolytic therapy and PCI, was observed in the USA.

Of patients admitted to hospitals with access to a Cath lab, 17% underwent PCI as the initial reperfusion strategy, compared with 8% of patients in hospitals without a Cath lab. The overall rates of reperfusion therapy were similar (approximately 70%), irrespective of whether hospitals had access to a Cath lab. Hospital teaching status also affected the type of reperfusion chosen, with 18% of patients who were admitted to teaching hospitals (n=1249) undergoing PCI alone, compared with none of the patients in non-teaching hospitals (n=425).

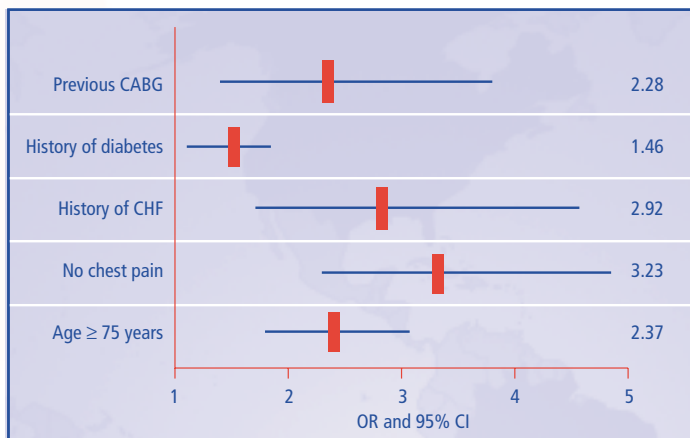
Patients who were aged over 75 years or older, had presented without chest pain, had previously undergone primary CABG, had diabetes, or had a history of CHF or MI, were less likely to receive reperfusion therapy. Of patients diagnosed with STEMI and with a history of CHF, 60% did not receive reperfusion therapy despite presenting within 12 hours of the onset of symptoms. Similarly, 58% of patients who presented without chest pain but with significant ST-segment elevation did not receive any reperfusion therapy.

Stepwise multivariate logistic regression was used to analyze age, sex, history of diabetes, MI or CHF, previous CABG,



**Figure 1.**

Type of reperfusion therapy received by patients who present early with STEMI (n=2501)



presentation without chest pain, teaching status, access to an on-site Cath lab, and geographic region. This analysis revealed significant predictor variables of no reperfusion (Figure 2). The ORs of not receiving reperfusion therapy were high for patients who had previous CABG, had presented without chest pain, were aged 75 years or older, or had a history of CHF.

### Discussion

The present findings show that nearly one-third of patients who present with STEMI within 12 hours of the onset of symptoms and who are eligible for reperfusion therapy do not receive it. Furthermore, these data highlight significant differences in the type of reperfusion therapy used, both according to geographic location and hospital status. For example, PCI is performed more frequently in sites located in Argentina and Brazil, the USA, and in parts of Europe. It remains to be seen whether these differences in reperfusion strategy affect patient outcomes.

Patients with previous CHF or CABG, and patients presenting without chest pain but with symptoms of ischemia, are the least likely to receive reperfusion therapy. In addition, patients who are female, have diabetes or have a history of MI are less likely to receive reperfusion therapy, although its absolute benefits could be greater for them than for the general population.

**Table.** Type of reperfusion strategy by geographic location

Location of sites	ANC (n=269)	USA (n=327)	AB (n=339)	EUROPE (n=739)
Patients (%)				
No reperfusion	30	33	28	30*
PCI alone	1	18	14	16*
Fibrinolytic alone	67	31	53	49*
PCI + fibrinolytic	2	19	5	5*

\*Single chi-squared test.  
P-value <0.0001 for each 4x4 table.

The findings of this multinational, observational study show that elderly patients are less likely to receive reperfusion therapy than those aged under 75 years. Although the relative risks of reperfusion therapy are greater in elderly patients, research suggests that they generally benefit as much, if not more than, younger patients.<sup>5,6</sup> The benefits of fibrinolytic therapy for patients in cardiogenic shock are controversial,<sup>7</sup> but the role of fibrinolytic therapy in patients with dyspnea or previous heart failure has not been questioned.<sup>1</sup>

These results show that there is still significant room for improvement in the treatment of patients who present early with STEMI. While the optimal strategy for reperfusion is the subject of debate, routine clinical practice is still a long way from the aim of providing reperfusion therapy for all eligible patients who present early with STEMI.

### References

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