Influence of Time to Treatment Interval on Myocardial Salvage in Patients With Acute Myocardial Infarction Treated With Coronary Artery Stenting or Thrombolysis

To the Editor:

Schömig et al report an elegant study on the effect of thrombolysis or primary angioplasty on myocardial salvage in acute ST-elevation myocardial infarction. Their conclusion is that stenting is preferred over thrombolysis regarding salvage of myocardium. However, their methods raise several questions.

First, why are time intervals chosen according to the tertiles of the time-to-treatment intervals, 165 minutes (2 hours and 35 minutes) and 280 minutes (4 hours and 40 minutes)? Why not choose time intervals of 1:00, 2:00 and 3:00 hours, as in the Global Utilization of Streptokinase and Tissue Plasminogen Activator for Occluded Coronary Arteries (GUSTO)-1 study? Choosing 165 minutes can be interpreted as there being too few patients treated within 2 hours after onset of pain to perform a statistical analysis.

Secondly, in patients treated with stenting, the time-to-treatment interval was calculated from the onset of symptoms to the onset of balloon inflation, which is the time to reperfusion. In patients treated with thrombolysis, the time from onset of symptoms to initiation of lytic therapy was used. However, reperfusion of the blocked artery usually occurs ~60 minutes after initiation of lytic therapy. So, 2 different times are being compared, which is confusing, and not favorable to the thrombolysis group. In fact, the way the study is reported suggests a comparison of primary stenting and late thrombolytic therapy. In Nijmegen, The Netherlands, two thirds of patients are treated within 2 hours after onset of symptoms using a prehospital strategy. This treatment is associated with a 17% abortion of myocardial infarction, with complete salvage of myocardium at risk. Furthermore, in a survey of 236 patients treated in Zwolle, The Netherlands, a strategy of prehospital triage and primary angioplasty resulted in a median time to reperfusion of 170 minutes, resulting in an 11% abortion of myocardial infarction. Of 54 patients reperfused within 2 hours, 25% had aborted myocardial infarction, significantly more than the 7% aborted myocardial infarction of patients treated later than that.

In conclusion, salvage of myocardium with thrombolysis is not studied in the report in question, because thrombolysis is given relatively late. And there may be more myocardium to salvage with primary stenting, if it is performed within 2 hours after onset of symptoms.

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Response

We appreciate the comments of Drs Elsman, Lamfers, and Verheugt on our study. The objective of our study was the assessment of the time dependence of efficacy of thrombolysis or coronary stenting in patients with acute myocardial infarction. Larger and specifically designed studies are required to define cutoff time intervals that may guide selection of optimal reperfusion strategy. Following the suggestion of the Dutch colleagues, we analyzed 43 patients of the study cohort treated within the first 2 hours from symptom onset and found that myocardial salvage was greater in the group with stenting than in the group with thrombolysis; salvage index, median (25th percentile; 75th percentile), 0.58 (0.49; 0.81) versus 0.41 (0.12; 0.64), respectively; P=0.05.

With regard to the definition of the time-to-treatment interval, an accurate assessment of the reperfusion time with thrombolytic therapy is difficult in the absence of serial angiographic examinations, because time interval from initiation of thrombolysis to opening of the infarct-related arteries is variable and unpredictable and can hardly be estimated noninvasively. However, to address the authors’ concern, we compared myocardial salvage in patients treated with stenting within <165 minutes (original cutoff point for the first tertile) with that of patients treated with thrombolysis within <105 minutes (original interval shortened by 60 minutes to adjust for the potential bias mentioned by Dr Elsman and colleagues). We found a salvage index of 0.56 (0.49; 0.75) in patients treated with stenting within 165 minutes and 0.41 (0.09; 0.68) in patients with thrombolysis initiated within 105 minutes from symptom onset (P=0.05).

In conclusion, the results of our study, and of the additional analyses presented here, support the position of Dr Elsman and colleagues that the efficacy of thrombolysis in patients with acute myocardial infarction is largely confined to a short time interval after symptom onset. In addition, our results indicate that coronary stenting is superior to thrombolysis even in this short interval.

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