Impact of Time to Treatment on Mortality After Prehospital Fibrinolysis or Primary Angioplasty

To the Editor:

We read with interest the article by Steg et al.,1 which reported that prehospital thrombolysis may be preferable to primary percutaneous coronary intervention (PCI) for patients treated within the first 2 hours after symptoms begin. A recent study,2 however, reported the superiority of primary angioplasty over fibrinolysis for patients needing transportation that takes 2 hours or less.

In all studies, time-dependency of reperfusion success is usually evaluated in terms of time from symptom onset, not from time of symptom onset. It is not the same to have a myocardial infarction in the morning or in the evening. In morning hours, from 6 AM to noon, platelet aggregability and plasminogen activator-inhibitor activity increase,3 a milieu potentially capable of reducing the efficacy of thrombolysis.4 By contrast, recent evidence shows that angioplasty performed in the evening/night hours has higher failure and 30-day mortality rates,5 possibly because of the detrimental impact of fatigue and sleep deprivation on the operator’s cognitive and motor performances.

If morning is a critical time for thrombolysis and night for angioplasty, it is possible that the superiority of a procedure versus another is not absolute. Further studies should evaluate whether myocardial infarction is likely to require one treatment or another, depending in part on time of day of symptom onset.

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Response

In their comments on our article,1 Drs Manfredini and Boari point out the issue of circadian variations in the efficacy of reperfusion therapy, whether related to variations in platelet function or coagulation (potentially reducing the efficacy of thrombolysis in the morning) or to the performance of angioplasty teams (eg, lower efficacy at night). Indeed, Henriques and colleagues2 have reported a circadian variation in outcomes of primary angioplasty for acute myocardial infarction, although in a previous smaller study, we found similar outcomes during daytime and “off” hours.3 By definition, however, such analyses are always observational and may be confounded by variations in health care delivery, particularly prehospital referral patterns and delays.4 Because patients seen at night at a given center may differ from those seen during daytime for many reasons other than true variation in the performance of therapies, we advise caution before recommending a specific choice on the basis of the time of the day at which symptoms appear.

Currently, in ongoing ST-segment elevation myocardial infarction, strategic decisions regarding reperfusion must be made in emergency situations and already involve a complex analysis of time elapsed since symptom onset, eligibility for fibrinolysis, accessibility and time to transfer to an interventional center, and expertise of the interventional team.5 Adding to that list the time of the day is, at least for the moment, unproven and will make decisions even more complex. There remain major problems in the care of myocardial infarction worldwide; patients are seen or treated too late, and many eligible patients fail to receive any reperfusion therapy.6 We therefore suggest that efforts continue to provide reperfusion therapy as early as possible to the largest possible proportion of patients. Both fibrinolysis (which is more effective and provided earlier in a prehospital setting than in the hospital) and emergency percutaneous coronary intervention are useful in that respect, and a logical algorithm has been delineated for selecting the proper strategy or combination thereof.6

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