Interaction Among Risk-Time and Benefit of Primary Angioplasty

We read with interest the study by Brodie et al. (1) showing that delays in door-to-balloon time have an impact on survival in high-risk patients with ST-segment elevation myocardial infarction (STEMI) treated by primary percutaneous coronary intervention (pPCI). We have the following concerns in relation to the reported results and conclusions in this single-center study.

In the current study, symptom-onset-to-balloon time was not included in the multivariate analyses. Considering that door-to-balloon time is significantly related to outcome only in patients with symptom onset less than 3 h when a striking benefit of reperfusion is present (1), it is very likely that the exclusion of total ischemic time from the multivariate analyses would have influenced the results. To this regard, in the single-center study conducted by De Luca et al. (2), door-to-balloon time was not related to outcome independently by the risk of the patients, but symptom-onset-to-balloon time and patent infarct-related artery remained independent predictors of 1-year survival in high-risk patients with STEMI. Indeed, Brodie et al. (1) did not take into account in their analyses the patency of the infarct-related artery at index angiography that was present in one-fifth of patients.

Finally, the results may be further biased by the fact that longer door-to-balloon times were observed in sicker patients treated by pPCI with a limited use of stents and abciximab (less than 30%) that are not representative of the actual worldwide standard.

Finally, although losing time appears to be prognostically less important in low-risk patients than in high-risk patients with STEMI treated by pPCI, when immediate thrombolysis is feasible, delaying PCI may be particularly disadvantageous in low-risk patients (3). On the contrary, a longer delay could be justified to choose pPCI for high-risk patients, despite the increased risk associated with delay according to the previously reported “risk-time-benefit” relationship (3).

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REFERENCES


REPLY

Our study (1) analyzed the relationship between door-to-balloon time and mortality rather than symptom-balloon time because door-to-balloon time is the strongest predictor of mortality and because we have influence over door-to-balloon time. We did not include symptom-balloon time in the multivariable analysis because symptom-balloon time is correlated with door-to-balloon time. Either is a significant predictor of mortality when included in the model alone. When both are included, symptom-balloon time is no longer a significant predictor of mortality.

We evaluated the relationship between door-to-balloon time and mortality 1) in patients who had Thrombolysis In Myocardial Infarction (TIMI) 0 to 1 flow in the infarct artery on initial angiography and 2) in patients treated since 1996 when stents and glycoprotein (GP) IIb/IIIa inhibitors were standard care. The results in these two groups were similar to the group as a whole. Therefore, we do not believe that inclusion of patients with TIMI 2 to 3 flow on initial angiography and patients treated before the availability of stents and GPIIb/IIIa inhibitors affected our results.

We disagree with Tarantini and colleagues that “delaying (percutaneous coronary intervention) PCI may be particularly disadvantageous in low-risk patients.” We agree that primary PCI probably offers no mortality advantage over fibrinolytic therapy in low-risk patients, but our data and the data of others clearly show that time delays to primary PCI have little impact on mortality in low-risk patients. In low-risk patients presenting to noninterventional hospitals, transfer to an interventional facility for PCI avoids the risk of bleeding and intracranial hemorrhage from fibrinolytic therapy and results in fewer strokes and less reinfarction.

We agree with Tarantini et al. that the absolute mortality benefit of PCI over fibrinolytic therapy is considerable in high-risk patients, and this advantage may justify longer delays to PCI. However, our data show that these delays do have a major impact on mortality, especially in patients who present early. The hope has been that, in patients who present to noninterventional hospitals, with long delays to primary PCI, early pharmacologic reperfusion therapy followed by transfer for PCI (facilitated PCI) would establish earlier reperfusion and reduce mortality. Unfortunately, the recently published ASSENT-4 PCI (Assessment of the Safety and Efficacy of a New Treatment Strategy with Percutaneous Coronary Intervention) study showed worse, rather than better, outcomes with tenecteplase-facilitated PCI (2). There are several possible reasons for this, and it is possible that future trials with facilitated PCI using alternative pharmacologic therapies (such as FINESSE [Facilitated Intervention for Enhanced Reperfusion Speed to Stop Ischemic Events]) may prove beneficial, especially in high-risk patients presenting early after the onset of symptoms who have long delays to PCI. Until we have more data, the best strategy for high-risk patients who present early to noninterventional hospitals with very long delays to primary PCI may be local fibrinolytic therapy followed by transfer to an interventional facility for rescue PCI if needed. In high-risk patients who present later, the best strategy may be transfer for primary PCI without fibrinolytic therapy, even with longer delays to PCI.

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