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Depression as Another Possible Explanation for Worse Outcomes in Myocardial Infarction During Off-Hours

We read with great interest the findings of Henriques et al. (1) regarding worse clinical outcomes for acute myocardial infarction (MI) patients treated with primary angioplasty during off-hours. In their otherwise excellent study, the investigators failed to measure depression or to mention it as another possible reason for the increased rates of failed angioplasty and 30-day mortality observed in those patients presenting between the hours of 1800 and 0800. Depression is common among patients with coronary disease (2), and depressed patients are more likely to develop initial MI symptoms off-hours (3). Depressed patients admitted for MI are at significantly increased risk for mortality (2) and for repeat coronary revascularization (4). Moreover, depression is associated with perturbations of circadian rhythms in patients with and without coronary disease (5). Thus, in addition to the reasons offered by the investigators (1), depression may be another explanation for the worse outcomes observed in patients presenting off-hours.

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Circadian Variations in Outcome of Primary Percutaneous Coronary Intervention

We read with interest the report by Henriques et al. (1) regarding circadian variations in outcomes of primary angioplasty for acute

myocardial infarction. The investigators cite a higher angioplasty failure and a higher mortality in patients treated during the "off-hours" despite similar baseline characteristics and procedural delays compared with patients treated during daytime. The researchers also point out that only 23% of the total cohort was treated during the night. This suggests a potential selection bias of the patients treated at night, particularly among the 11 community hospitals referring patients to the single percutaneous transluminal coronary angioplasty (PTCA) center involved. In a previous smaller study (2), addressing a cohort of consecutive ST-elevation myocardial infarction patients admitted to a single center performing primary percutaneous coronary intervention (PCI), we found that 61% of the patients were treated during off-hours (also counting weekend hours), a percentage perfectly in line with the proportion of off-hours during the week (64%). In that study, despite worse baseline characteristics of patients admitted during off-hours, patients experienced almost identical procedural success rates (98% vs. 96% TIMI [Thrombolysis In Myocardial Infarction] 3 flow rates for "off" vs. business hours), predischARGE radionuclide left ventricular ejection fraction (51 ± 14 vs. $53 \pm 12\%$) and in-hospital death rates (7% vs. 5%) compared with patients treated during business hours ($p = \text{NS}$ for all comparisons).

As pointed out in the accompanying editorial in the *Journal* (3), the variations in patterns of care and outcomes reported by Henriques et al. (1) may be related to biological circadian variations but also to variations in health care delivery, particularly prehospital referral patterns and delays. We submit that the latter are more likely than the former. To explore this issue further and to minimize biases related to prehospital referral, we suggest that data be analyzed from several centers with a "captive" patient population (i.e., only one hospital serving a given population) and using primary PCI as the sole reperfusion therapy for ST-elevation myocardial infarction.

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REPLY

We appreciate Dr. Haas's as well as Dr. Steg's and their colleagues' interest and comments on our report concerning the different