

Primary Angioplasty and Diurnal Variations

To the Editor:

We were extremely interested in the recent article by Mingo et al,¹ which analyses delays before reperfusion, its determining factors and its prognostic repercussions in 389 patients with acute ST-elevation myocardial infarction (STEMI) who received a primary percutaneous coronary intervention (primary PCI) in a Spanish hospital between 2005 and 2007. The purpose of this letter is to reflect on the different aspects of primary PCI in elevated ST segments.

Firstly, the distribution of coronary syndromes is not uniform throughout the day; rather, it undergoes

rhythmic variations.² It has been clearly demonstrated that the beginning of an acute myocardial infarction most frequently occurs in the early hours of the morning, which has raised our interest in finding out what causes explain this circadian pattern, and what their clinical and therapeutic implications are.²

Secondly, various studies have provided data regarding the poor clinical results obtained by primary PCI performed outside normal working hours (between 17:00 and 8:00).^{3,4} In particular, Henriques et al³ demonstrated that a total of 1702 patients with STEMI who came to the hospital between 18:00 y and 8:00 had a higher mortality index and a greater rate of primary PCI failure. Furthermore, in a cohort study of 102 086 patients from the National Registry of Myocardial Infarction (NORMI-USA), Magid et al⁴ demonstrated that in patients who presented STEMI during the night, it took longer to perform a primary PCI than a fibrinolysis. The same authors concluded that 33 647 patients that were treated with primary PCI had a higher hospital mortality rate when symptoms began at night, in relation with the longer delay of reperfusion. In a similar way to the above studies, our group recently⁵ published the results of STEMI patients who were treated with primary PCI between the hours of 8:00 and 18:00 and between 18:00 and 8:00. We studied 90 consecutive patients with STEMI who had been treated with primary PCI, and the results obtained were worse when the PCI was performed between 18:00 and 8:00. On the other hand, other studies have not shown the

differences in the results of primary PCI when it is performed outside of normal working hours.^{6,7}

Thirdly, it is accepted that daily modifications occur in humoral factors such as the rise in platelet aggregability in the early hours of the morning and the circadian variability of the inflammatory molecules in patients with acute myocardial infarction.⁸ In addition, we have seen that there is a clear link between inflammation and thrombosis, which exercise reciprocal influences.⁹

In conclusion, we would like to raise the possibility that circadian variations in the balance between prothrombotic, natural fibrinolytic and inflammatory processes may have at least a partial effect on the success of a primary PCI.

Alberto Domínguez Rodríguez,^a Pedro Abreu González,^b
and Francisco Bosa Ojeda^a

^aServicio de Cardiología, Hospital Universitario de Canarias, Tenerife,
Santa Cruz, Spain

^bDepartamento de Fisiología, Universidad de la Laguna,
La Laguna, Santa Cruz, Spain

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Response

To the Editor:

We appreciate the interest in our article shown by Domínguez et al. Their letter correctly describes our current knowledge about the influence of circadian variations in the incidence and success rates of primary (PCI).

Although this aspect is not listed among the principal objectives of our study, it was at least partially analysed. The analysis showed that there were no significant differences in mortality following primary PCI if it is performed within working hours (n=154) or non-working hours (n=229). Indeed, the figures, whether after 30 days or 1 year, were lower during non-working hours (4.8% compared with 8.4%; $P=.15$, and 7.9% compared with 11.1%; $P=.29$). There were no significant differences in no-reflow incidence (12.6% for non-working vs 8.9%; $P=.28$), or in coronary and myocardial flow as evaluated by the TIMI and TMPG flow scales respectively.

These findings appear to be contradictory to that shown by the literature,¹ exactly as Domínguez et al describe, and in our opinion they reflect the multifactorial nature of clinical results following primary PCI. On the one hand, experience and better door-to-balloon times are likely during working hours, while other potential factors, such as circadian variations in platelet aggregability may be acting against us.

In any case, it is worth pointing out that door-to-balloon time, which is a main factor determining the clinical success of primary PCI,² is normally higher outside of working hours. In our study, it was 22 minutes higher outside of working hours and with no notice, and was reduced to a 14-minute difference only if there was advance warning. The presence of this delay in door-to-balloon time with advance warning could partially explain the good clinical results outside of working hours.

Javier Goicolea and Susana Mingo

Unidad de Hemodinámica, Servicio de Cardiología, Hospital Puerta de Hierro, Majadahonda, Madrid, Spain

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