Rev Esp Cardiol. 2019;72(6):443–444

Editorial

Causes of Higher In-hospital Mortality Due to ACS in the Canary Islands and Possible Solutions

Causas de la mayor mortalidad hospitalaria por IAM en Canarias y sus posibles soluciones

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Article history:
Available online 9 March 2019

In-hospital mortality due to acute myocardial infarction (AMI) is an objective parameter that is easy to measure and interpret and as such has been used as an index of quality of care.[1] In-hospital mortality from AMI has declined markedly in recent decades but remains high in certain patient subgroups and populations, which have become a priority focus of research and prevention programs.

An illuminating cross-sectional study published recently in *Revista Española de Cardiología* shows that in-hospital mortality from AMI is notably higher in the Canary Islands than in the rest of Spain.[2] Mate Redondo et al. analyzed records in the Minimum Basic Data Set from 415 798 patients admitted for AMI in Spain between 2007 and 2014. Within this population, 3.9% of the patients were admitted to hospitals in the Canary Islands. The study reveals the disadvantageous situation of the Canary Islands compared with the rest of Spain, showing that Canary Island AMI patients are younger than their counterparts elsewhere in Spain and have a higher prevalence of associated risk factors.

The mean age difference between patients admitted for AMI in the Canary Islands and the rest of Spain was 5 years for men and 3 years for women. Similarly, patients dying during hospitalization for AMI were on average 4 years younger in the Canary Islands than elsewhere (74.0 ± 11.9 years vs 78.4 ± 11.1 years; $P < .001$). These data demonstrate that the clinical profile of AMI patients in the Canary Islands is distinct from that of their counterparts in the rest of Spain, a difference the authors attribute to the higher prevalence of risk factors associated with premature AMI in the Canary Islands,[3] most notably tobacco and cocaine use. The study shows that the Canary Islands has the highest prevalence of smoking in Spain. Moreover, the authors report that male smokers hospitalized for AMI were on average 13 years younger than male nonsmokers, while for women the age difference between smokers and nonsmokers was 21 years. This finding is in line with data from the TABARCA study, a multicenter registry run by the Spanish Society of Cardiology that examines the association between AMI and smoking.[4] The TABARCA registry data also show that the characteristics and clinical course of AMI were very similar in smokers and nonsmokers, despite smokers in the registry being 8 to 10 years younger. Follow-up of TABARCA registry patients at 1 year revealed that only two thirds of smokers had completely stopped smoking. Together with the results of the Mate Redondo et al. study,[2] these findings provide strong evidence for the determining role of smoking in the acceleration of atherosclerosis underlying AMI and underline the need to prioritize smoking cessation in primary prevention strategies.

The authors also analyzed the population fraction attributable to individual cardiovascular risk factors to assess their impact on AMI incidence and associated mortality. The authors present convincing evidence that the highest reduction in avoidable deaths would be achieved by eliminating diabetes mellitus, which has its highest prevalence nationally in the Canary Islands (9.4%), followed by Andalusia (8.7%) and Murcia (8.4%). Diabetes is firmly established as the risk factor with the strongest impact on individual risk, and the data presented by Mate Redondo et al.[2] highlight the determining influence of diabetes at the population level. These results could, and perhaps should, prompt health care and scientific authorities in each autonomous region to prioritize those cardiovascular prevention strategies most likely to reduce AMI incidence in their region. In the Canary Islands, it seems clear that efforts should focus on smoking cessation and diabetes prevention. Primary prevention strategies for cardiovascular disease that promote lifestyle and dietary improvements have a major impact on mortality from AMI but are often poorly implemented, whether at a regional, local, or individual level. For example, smoking bans reduced the incidence of AMI and lung diseases in the months after they were introduced, but longer-term evaluation showed that this effect has not been maintained.[5] The solid scientific evidence, such as that provided by Mate Redondo et al.,[2] shows that there is still much room for improvement in the primary prevention of cardiovascular disease.

In addition to analyzing etiological factors and the population fraction[0] attributable to each factor, Mate Redondo et al.[2] also describe important features of AMI-related mortality. In line with previous studies,[6,7] the authors found a progressive decrease in the proportion of AMI patients admitted with ST-segment elevation (STEMI) relative to the number of patients without ST-segment elevation (NSTEMI). Moreover, STEMI continues to be associated with higher in-hospital mortality than NSTEMI, but studies have shown that long-term prognosis is notably worse in patients discharged after a diagnosis of NSTEMI.[8,9] This has important

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https://doi.org/10.1016/j.rec.2018.06.023

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https://doi.org/10.1016/j.rec.2018.11.019

implications not only for the clinical management of ischemic heart disease, but also for health care resource management. Due to the extensive evidence for the effectiveness of early coronary revascularization in STEMI and the recommendation for this procedure in clinical practice guidelines,[10] local and regional systems have been established to extend and standardize the use of percutaneous coronary intervention. However, patients with NSTEMI have a much more heterogeneous clinical profile, and it is therefore much more difficult to standardize its treatment.[9] Although the treatment of NSTEMI has improved markedly over recent decades,[11] large differences remain depending on the type of hospital[9,12] and the specialty of the admitting physician[1]; these differences should prompt assessment of the need for local and regional systems for the treatment of NSTEMI, to match those already in place for STEMI.[12] Most registries have recorded an NSTEMI diagnosis in two thirds of patients admitted for AMI,[7,8] reflecting the importance of NSTEMI in clinical management and patient care. Nevertheless, there is a tendency to underuse guideline-recommended measures that critically improve medium- and long-term prognosis in NSTEMI patients, such as revascularization[9,11,13] and optimal medical treatment.[14]

In the study by Mate Redondo et al.,[2] mortality due to AMI was highest in the Canary Islands, but the difference relative to other regions was most notable among patients with diabetes. The autonomous communities with the next highest in-hospital mortality rates were Andalusia and Aragon. Moreover, as the authors point out, the absence of any decrease in mortality in the Canary Islands reveals major inequalities in AMI-related in-hospital mortality among the different autonomous communities. Contrasting the situation in the Canary Islands, significant reductions in AMI-related in-hospital mortality during the study period were recorded in 6 autonomous communities (Andalusia, Catalonia, Valencia, Asturias, Cantabria, and Extremadura), possibly reflecting the dedication of health care professionals, politicians, and managers to improving AMI treatment. In the latest Spanish Cardiac Catheterization and Coronary Intervention Registry, the Canary Islands had the lowest rate of primary percutaneous coronary intervention per million inhabitants and the second to lowest rate of percutaneous coronary intervention overall.[15] It is thus clear that there is a large amount of room for improvement in AMI treatment, and that appropriate measures could reduce the currently high mortality in the Canary Islands.

Administrative databases like the Minimum Basic Data Set used by Mate Redondo et al.[2] do not include clinical variables related to clinical decision making. This is an important limitation because, in addition to characterizing the variables associated with AMI incidence and revascularization rates, it would be very useful to identify barriers to the implementation of guideline recommendations. The database analyzed by Mate Redondo et al.[2] lacks information on important variables that could refine the study conclusions, such as moderate renal dysfunction, previous hemorrhage, frailty, and morbid obesity. For example, without this kind of information, it is impossible to determine whether the high rate of in-hospital mortality among diabetes patients in the Canary Islands is due to a higher prevalence of morbid obesity. On the other hand, the Minimum Basic Data Set provides very large sample sizes that tend to minimize the influence of statistical biases and other methodological limitations. Moreover, the Minimum Basic Data Set permits comparison between autonomous communities, types of hospital, and approaches to patient care, thus broadening the scope of clinical research into AMI.

In conclusion, the results of the interesting study by Mate Redondo et al.[2] suggest that strategies to improve the adverse situation in the Canary Islands should focus on 2 key areas: *a)* improving primary prevention of cardiovascular disease through measures to promote smoking cessation and diabetes prevention, and *b)* improving patient care during hospitalization for AMI.

CONFLICTS OF INTEREST

None declared.

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