EDITORIAL

Cardiac arrest: epidemiologic research on providing appropriate emergency management

Código infarto: investigación epidemiológica y en gestión para una adecuada asistencia

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The complexity of today's healthcare systems in western countries makes coordination between the different structures, teams and levels of care crucial to ensure patient-centered healthcare. In their beginnings, emergency medical systems (EMS) were independent and isolated structures that provided highly specialized and quality care to critically ill patients in an out-of-hospital setting. As a result of their natural process of growth and development, they have been integrated, with greater or lesser success, into the health care systems as a whole. They have improved comprehensiveness of the care process for critically ill patients by involving the different levels of care (primary care –PC–, EMS, hospital emergency, intensive care units)[1,2] and adapting to new patient profiles derived from the demographic evolution of the population and the improvement in health care standards[3-5].

Among these organized and integrated care processes, acute myocardial infarction (AMI) care has improved substantially thanks to advances in interventional cardiology and improved intra-level coordination. Three articles published in this issue of EMERGENCIAS analyze the factors on which we could focus to further improve care. Essentially organizational aspects, such as the availability of a chest pain box in hospitals without hemodynamics, as indicated in the article by Carol Ruiz et al,[6] are low-cost interventions that improve health outcomes by reducing the time between the onset of symptoms and coronary intervention. A well-sized EMS that manages the entire process in an agile manner, from the first contact of the patient or alerting person with the health care system[7] to transfer to a hospital equipped with hemodynamics, improves the quality of the process and ensures equity in health care among the population. One area of research, still relatively unexplored in Spain, is the analysis of the economic and health impact[8] of an adequately equipped EMS[9].

The article by Aboal et al. is interesting in that a first medical contact at home or in the street reduces the relative risk of primary angioplasty times of more than 120 minutes[10]. This highlights, as Lapostelle et al. also point out in their article[11] the need to implement health education measures aimed at the appropriate use of EMS and the early recognition of coronary symptoms by the patient to avoid, as far as possible, going on their own initiative and without adequate care to a hospital center without the possibility of coronary intervention, which would certainly increase the time to opening of the artery. The integration of PC teams in AMI care programs, through adequate technical resources, training programs, and coordination with the EMS, is an important factor in guaranteeing or improving geographic equity in the care of this pathology. The article by Lapostelle et al. has an interesting finding, which is the sex bias already detected in other studies. This should alert us to the management of AMI in women. In their article they point out that the existence of a specific AMI care program improves access to reperfusion techniques, something that has been amply demonstrated in previous studies. An essential strength of the study by Lapostelle et al. is the quality of its data source, which is a regional, multicenter registry of cases. Registries are a particularly useful epidemiological research tool because As a standard[12], they constitute data files on a disease or health process or condition that can be directly referred to a well-defined base population. This gives them the character of population registries and allows the researcher to calculate the incidence of a phenomenon with high precision in the estimation, as well as prevalence and survival if the cases are followed up, and all this in the absence of selection bias[13]. In this way, they provide a quality view of the magnitude of the problem studied in a specific geographic and population area.

The three studies highlight a very relevant fact: the importance of coordination between levels of care, not only to obtain good health outcomes, but also to improve the equity of the health care system. The analysis of the health system, its resources and the monitoring of interventions are key elements of health planning[14]. Traditionally, the allocation and distribution of EMS resources, based on essentially population and isocrone criteria[15], benefits urban centers to the detriment of more sparsely populated areas.

The three studies show the importance of adequate regionalization of EMS resources to reduce prehospital

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care times, which direct care by EMS minimizes. However, other aspects should also be considered when designing the prehospital response structure to improve comprehensive care for AMI. In this way, we would avoid using only "utilitarian" models and apply resource distribution models based on other social welfare indicators such as the Bernoulli-Nash[16] or isoelastic model, seeking the principles of justice and equity of the health care system above aspects of efficiency. This approach would make it possible to maintain adequate AMI care in a timely manner in urban areas, and improve the quality of care in areas far from centers with hemodynamic centers.

Although the articles published in this issue of EMERGENCIAS refer to data prior to the COVID pandemic, we cannot end this editorial without mentioning its impact on the management of AMI. Recent studies have concluded that during the COVID pandemic, there have been no changes in first medical contact-reperfusion times, although ischemia time has increased, as have in-hospital mortality[17] and in-hospital times[18]. These findings are consistent with what was expected from the three articles published in this issue of EMERGENCIAS: health education as an essential factor for the recognition of symptoms and early care, probably affected in the pandemic by patients' fear of going to the hospital; and the organization of resources as the key to minimizing care times. During the COVID pandemic, prehospital care, once the resource has been sent, has probably maintained its quality criteria in terms of prehospital times, since no differences have been found in first medical contact-reperfusion times, and the increase in in-hospital times has probably been related to care and COVID aspects (use of personal protective equipment, in-hospital care overload, etc). It is necessary to investigate prehospital AMI mortality due to prolonged prehospital times due to delays in requesting assistance or due to EMS overload. Recently published studies have already led us to suspect a possible increase in the percentage of cardiac arrests without advanced CPR, pointing to excessive collapse time as the main cause[19]. Health education, interlevel coordination, provision of care and adequate monitoring of the processes by means of epidemiologically based prospective registries that allow analysis of activity and results are the key to improving the processes of AMI care, as well as equity in care.

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References

1 Rosell Ortiz F. Radiografía de los servicios prehospitalarios de emergencias. Emergencias. 2020;32:77-8.
2 Escalada X, Sánchez P, Hernández R, Gené E, Jacob J, Alonso G, et al. Estudio SEPHCAT: análisis de los servicios de emergencias prehospitalarios en Cataluña. Emergencias. 2020;32:90-6.
3 Coca Boronat E, Díaz Pérez MA, Lupiáñez Pérez I, Pérez Ardanaz B, Fuentes Ruíz JA, Morales Asencio JM. Prevalencia de diagnósticos enfermeros en pacientes crónicos en emergencias extrahospitalarias: mejorando la comprensión de la complejidad. Emergencias. 2020;32:211-2.
4 Martín-Rodríguez F, Sanz-García A, Ortega Moreno L, del Pozo Vegas C, Castro-Villamor MA, Martín-Conty JL, et al. Modelo de riesgo de mortalidad precoz en pacientes ancianos con enfermedad aguda atendidos por servicios de emergencias prehospitalarias. Emergencias. 2020;32:177-84.
5 Zamora-Soler JÁ, Maturana-Ibáñez V, Castejón-de la Encina ME, García-Aracil N, Lillo-Crespo M. Utilización e implementación de indicadores de calidad para evaluar la atención en las emergencias extrahospitalarias: revisión sistemática. Emergencias. 2019;31:346-52.
6 Carol Ruiz A, Masip Utset J, Ariza-Solé A, Gómez-Hospital JA, Carrillo X, Tizón H, et al. Predictores de demora en el intervencionismo coronario percutáneo primario en el infarto de miocardio diagnosticado en hospitales sin hemodinámica. Emergencias. 2021;33:187-94.
7 Guerineau A, Rozelle C, Sevestre E, Narcisse S, Laribi S, Giovannetti O. Escala predictiva para el diagnóstico de síndrome coronario agudo en la atención telefónica en un centro coordinador de emergencias: escala SCARE. Emergencias. 2020;32:19-25.
8 Fischer AJ, O'Halloran P, Littlejohns P, Kennedy A, Butson G. Ambulance economics. J Public Health Med. 2000;22:413-21.
9 U.S Department of Transportation. An analysis of prehospital emergency medical services as an essential service and as a public good in economic theory. Wasington DC, mayon 2014. (Consultado 20 Marzo 2021). Disponible en: https://www.ems.gov/pdf/advancing-ems-systems/Reports-and-Resources/Prehospital_EMS_Essential_Service_And_Public_Good.pdf
10 Aboal J, Ramos R, Loma-Osorio P, Núñez M, Comas-Cufi M, Iglesies J, et al. Factores asociados a retrasos de tiempo desde el electrocardiograma diagnóstico hasta el paso de guía en el infarto agudo de miocardio con elevación del segmento ST transferido para angioplastia primaria. Emergencias. 2021;33:195-202.
11 Lapostelle F, Loyeau A, Beggaz Y, Boche T, Pires V, Le Bail G, et al. Efecto de la edad, el sexo y el momento del día en el tiempo hasta el aviso al sistema de emergencias en pacientes con infarto agudo de miocardio con elevación del segmento ST. Estudio CLOC'AGE. Emergencias. 2021;33:181-6.
12 Last JM. A Dictionary of Epidemiology. New York: Oxford University Press; 1995.
13 Goldberg J, Gelfand HM, Levy PS. Registry evaluation methods. Epidemiol Rev. 1980;2:210-20.
14 Castro Delgado R, Arcos González P. El análisis de la capacidad de respuesta sanitaria como elemento clave en la planificación ante emergencias epidémicas. Emergencias. 2020;32:157-9.
15 Laporte G, Brotcorne L, Semet F. Ambulance location and relocation models. Eur J Oper Res. 2003;147:451-63.
16 Jagtenberg C, Mason A. Fairness in the Ambulance Location Problem: Maximizing the Bernoulli-Nash Social Welfare. (Consultado 20 Marzo 2021). Disponible en:https://ssrn.com/abstract=3536707 or http://dx.doi.org/10.2139/ssrn.3536707
17 Rodríguez-Leor O, Cid-Álvarez B, Pérez de Prado A, Rossello X, Ojeda S, Serrador A, et al. Grupo de Trabajo sobre Código Infarto de la Asociación de Cardiología Intervencionista de la Sociedad Española de Cardiología. Impacto de la COVID-19 en el tratamiento del infarto agudo de miocardio con elevación del segmento ST. La experiencia española. Rev Esp Cardiol. 2020;73:994-1002.
18 Rattka M, Dreyhaupt J, Winsauer C, Stuhler L, Baumhardt M, Thiessen K, et al. Effect of the COVID-19 pandemic on mortality of patients with STEMI: a systematic review and meta-analysis. Heart. 2021;107:482-7.
19 Navalpotro-Pascual JM, Fernández Pérez C, Peinado Vallejo FA, Carrillo Moya A, Muñecas Cuesta Y, Muñoz Isabel B, et al. Actividad y asistencia a la parada cardiorrespiratoria en un servicio extrahospitalario de emergencias durante la pandemia COVID-19. Emergencias. 2021;33:100-6.