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EDITORIAL

Prognostic factors of neurological outcome after cardiac arrest☆

Factores pronósticos de resultado neurológico tras un paro cardíaco

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The Spanish multicenter study on cardiac arrest published by Loza et al.[1] within the context of the Cardiological Intensive Care and Cardiopulmonary Resuscitation Working Group has been of considerable interest to us. Among other reasons, the study is notorious because it involves an important number of care units throughout Spain, and provides information corresponding to a 12-month follow-up period, which is longer than usually reported in the literature. This aspect of the study deserves to be highlighted, since a prolonged period of time is needed to assess the outcome of the neurological damage of hypoxic–ischemic encephalopathy, and the reported mortality and functional status results assessed by means of the Barthel score at 12 months are worthy of the best of healthcare systems.

The main results of the study point to older age, noncardiac causes of arrest, and a return to spontaneous circulation of over 20 min as severity predictors, while the presence of defibrillable rhythms[2] and coronary revascularization are established as protective factors. Other reported protective factors are the presence of a witnessing physician, short cardiopulmonary resuscitation times, and no need for adrenalin[3]. Hypothermia was irregularly used by the different centers, with criteria corresponding to those applied at the time of conception of the study and recruitment. The analysis of the results suggest that this practice did not influence either mortality or the neurological status of the patients. Particular mention is required of the discussion and analysis made by the authors of the role of hypothermia as part of the objectives of treatment.

It is known that among the combined parameters affording greatest certainty, mention must be made of the absence of N20 cortical waves in the short-latency somatosensory evoked potentials and ocular reflexes. It is advisable to perform the neurological examination on a daily basis[4], with significance being established from 72 h after the event or from the recovery of normothermia, once other confounding factors such as residual sedation or the use of muscle relaxants have been discarded. Their presence may make it advisable to prolong the analysis for several days; the required study period cannot be determined on a general basis, since up to 15–20% of all patients may be late awakeners, requiring periods that can reach 10–12 days[5,9].

The most influential exploratory signs are the bilateral absence of corneal and pupil reflexes[5], and a motor score of under 2 on the Glasgow scale. These data prove more specific when combined with others such as continuous and persistent myoclonus lasting over 30 min within the first 48 h; an isoelectric electroencephalographic tracing of low voltage (<20 μV), or burst suppression with generalized epileptiform activity[6]; or elevation of serum biomarkers such as neuron specific enolase at 48 h, S-100B, microRNA and tau protein – with no exact defined threshold according to the current recommendations. Lastly, mention must be made of the neuroimaging techniques such as brain computed tomography, which evidences brain edema, though with no consensus on how to apply these findings; and brain

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magnetic resonance imaging between the second and seventh day[7], showing hyperintense areas in diffusion weighted imaging. These techniques are all used in combination with other predictors.

The fact is that the availability of reliable predictors is very important in order to establish a prognosis as objective as possible and thus facilitate shared decision making, with the generation of information that is so necessary for the healthcare providers and is so demanded by the patient representatives. It is known that most deaths caused by post-cardiac arrest hypoxic-ischemic encephalopathy are secondary to the suspension of life support measures once a negative prognosis has been established[8,9]. We therefore need to optimize the specificity of the prognostic predictors, as this will help to avoid self-fulfilling predictions; in this regard, a multimodal approach is currently recommended, with the combination of different predictors[10]. This strategy and monitoring of the outcomes over the long term will probably serve to improve our understanding of this serious clinical condition and its prognosis.

References

1. Loza A, del Nogal F, Macías D, León C, Socías L, Herrera L. Predictors of mortality and neurological function in ICU patients recovering from cardiac arrest: a Spanish nationwide prospective cohort study. Med Intensiva. 2020, http://dx.doi.org/10.1016/j.medin.2020.02.006.
2. Grunau B, Reynolds JC, Scheuermeyer FX, Stenstrom R, Pennington S, Cheung C, et al. Comparing the prognosis of those with initial shockable and non-shockable rhythms with increasing durations of CPR: informing minimum durations of resuscitation. Resuscitation. 2016;101:50–6, http://dx.doi.org/10.1016/j.resuscitation.2016.01.021 [Epub 03.02.16].
3. De la Chica R, Colmenero M, Chavero MJ, Muñoz V, Tuero G, Rodríguez M. Prognostic factors of mortality in a cohort of patients with in-hospital cardiorespiratory arrest. Med Intensiva. 2010;34:161–9, http://dx.doi.org/10.1016/j.medin.2009.11.003 [Epub 12.02.10].
4. Sharshar T, Citerio G, Andrews PJ, Chieregato A, Latronico N, Menon DK, et al. Neurological examination of critically ill patients: a pragmatic approach. Report of an ESICM expert panel. Intensive Care Med. 2014;40:484–95, http://dx.doi.org/10.1007/s00134-014-3214-y [Epub 13.02.14].
5. Dragancea I, Horn J, Kuiper M, Friberg H, Ullen S, Wetterslev J, et al. Neurological prognostication after cardiac arrest and targeted temperature management 33 degrees C versus 36 degrees C: results from a randomised controlled clinical trial. Resuscitation. 2015;93:164–70, http://dx.doi.org/10.1016/j.resuscitation.2015.04.013 [Epub 25.04.15].
6. Sondag L, Ruijter BJ, Tjepkema-Cloostermans MC, Beishuizen A, Bosch FH, van Til JA, et al. Early EEG for outcome prediction of postanoxic coma: prospective cohort study with cost-minimization analysis. Crit Care. 2017;21:111, http://dx.doi.org/10.1186/s13054-017-1693-2.
7. Mlynash M, Campbell DM, Leproust EM, Fischbein NJ, Bammer R, Eyngorn I, et al. Temporal and spatial profile of brain diffusion-weighted MRI after cardiac arrest. Stroke. 2010;41:1665–72, http://dx.doi.org/10.1161/STROKEAHA.110.582452 [Epub 01.07.10].
8. Dragancea I, Wise MP, al-Subaie N, Cranshaw J, Friberg H, Glover G, et al. Protocol-driven neurological prognostication and withdrawal of life-sustaining therapy after cardiac arrest and targeted temperature management. Resuscitation. 2017;117:50–7, http://dx.doi.org/10.1016/j.resuscitation.2017.05.014 [Epub 12.05.17].
9. Sandroni C, D'Arrigo S, Nolan JP. Prognostication after cardiac arrest. Crit Care. 2018;22:150, http://dx.doi.org/10.1186/s13054-018-2060-7.
10. Nolan JP, Soar J, Cariou A, Cronberg T, Moulaert VR, Deakin CD, et al. Medicine guidelines for postresuscitation care 2015: Section 5 of the European Resuscitation Council. Intensive Care Med. 2015;41:2039–56, http://dx.doi.org/10.1007/s00134-015-4051-3.