Letters to the Editor

doi:10.1093/eurheartj/ehl536

Online publish-ahead-of-print 21 February 2007

Predicting survival with good neurologic recovery at hospital admission after successful resuscitation of out-of-hospital cardiac arrest: the OHCA score

We read with interest the article by Adrie et al.1 about outcome prediction, but we strongly disagree with the conclusion that outcome can be adequately predicted on hospital or ICU admission. Any diagnostic test should have significantly increased post-test probability with a positive test based on the prevalence in the population studied. The overall prevalence of poor outcome in this study was 259/340. Thus, a blank statement that all patients have poor outcome has a positive predictive value of 76% (95% CI 71–81). According to Table 5, an OHCA score cut-off point of 32.5 increases the positive predictive value to 94% (95% CI 89–97), but the corresponding specificity of 85% is not acceptable.1 We have to ensure that virtually all patients with the potential for good outcome are treated. The positive predictive value for poor outcome and the specificity should therefore be 0.99–1 or false-positive rate (1 – specificity) close to zero, all with a tight 95% CI.

A clinically useful test should still identify a large fraction of patients that would not benefit from time-consuming, costly, and emotionally exhausting intensive care treatment (reasonably high sensitivity). The test proposed in the paper does not have this perspective, and the sensitivity at the required specificity level is not provided. Figure 2 indicates an OHCA cut-off value of 50 for 0.99–1.0 specificity, and an area under the receiver-operator characteristic curve value of 0.88 indicates that the sensitivity will be too much low for OHCA 50 to make this test useful.1 In two recent, systematic reviews, false-positive rates for predicting poor outcome from multiple factors were not acceptably low enough until 24–72 h post-arrest.2,3 Survival rate to hospital discharge with good outcome for patients admitted to the ICU varies significantly between hospitals, independent of pre-hospital factors,4,5 and is much higher in some hospitals than the reported 22 and 25% in the development and validation cohort in the present study. In Oslo, favourable survival has almost doubled (up to 56%) after implementation of standardized post-resuscitation care including therapeutic hypothermia, with no differences in prognostic or metabolic factors on admission compared with previous data.6 Similar improved results have recently been documented from Lausanne7 and Stavanger.8

Accurate prediction of final outcome of out-of-hospital cardiac arrest patients at hospital admission is presently not possible, and only ethical considerations should limit active treatment at that stage. Decision making as recommended in the present study1 may be detrimental to the overall goal of more intact survivors after cardiac arrest. Unless ethically inadvisable, all resuscitated patients should at present receive optimal post-resuscitation care treatment including PCI (if indicated), therapeutic hypothermia, mechanical ventilation, and goal-directed intensive care treatment the first 24–48 h post-arrest.6 Correct treatment and correct decision making can save good lives. Withholding treatment on the basis of wrong prediction may take lives.

References


Kjetil Sunde
Ulleval University Hospital
Institute for Experimental Medical Research
and Department of Anaesthesiology
0407 Oslo
Norway
Tel: +47 23016824
Fax: +47 23016799
E-mail address: kjetil.sunde@medisin.uio.no

Jo Kramer-Johansen
Ulleval University Hospital
Institute for Experimental Medical Research
and Department of Anaesthesiology
0407 Oslo
Norway

Petter Andreas Steen
Ulleval University Hospital
Institute for Experimental Medical Research
and Department of Anaesthesiology
0407 Oslo
Norway

E-mail address: petter.steen@medisin.uio.no

doi:10.1093/eurheartj/ehl537

Online publish-ahead-of-print 21 February 2007

Predicting survival with good neurological recovery at hospital admission after successful resuscitation of out-of-hospital cardiac arrest: the OHCA score: reply

The main concern raised by Sunde et al. is a very important one and points to a need for bearing in mind the message of our manuscript.1 Under no circumstances should any scoring system (including the OHCA score) be used to help predict survival in the individual patient. As stated in our discussion (page 2844), ‘The probability predicted by our score is the probability in the average patient, not the individual patient’. Decisions to withhold life support are never taken after 24 h only on the basis of the SAPS or APACHE score,2,3 which are widely used in ICU patients; similarly, such decisions should never be taken on the
basis of the OHCA score at admission. The OHCA score merely estimates the probability of a good (or poor) outcome. It is a valuable tool for designing epidemiological studies, constituting a group of patients whose disease is within a predefined severity range, or adjusting data on the basis of severity. The OHCA should never be used to take a decision in an individual patient. Therefore, the criticism by Sunde et al. of our statistical analysis is inappropriate: a receiver-operating characteristic value of 0.88 indicates a very good predictive ability but, of course, does not indicate usefulness for predicting outcomes in individual patients. This issue is discussed in detail in a very recent review by Le Gall, one of the designers of the SAPS.

We designed a classic outcome prediction model on the basis of a development cohort and then we evaluated it in a validation cohort according to a process that has been used for many other scores. Its originality lies in its continuous nature, which avoids the class jump phenomenon seen with some severity scores. We do not know whether this score can be extrapolated to other healthcare systems; this point needs to be evaluated. Adjustments according to the healthcare system and improvements in patient management over time may be required, as with the SAPS (for which the third version was introduced recently).

In their retrospective study comparing patients treated with hypothermia to historical controls, Oddo et al. found evidence that hypothermia might substantially improve outcomes of patients with cardiac arrest due to ventricular fibrillation. However, they stated that 'The outcome after cardiac arrest due to nonventricular fibrillation rhythms was poor and did not differ significantly between the two groups'. Although we also use therapeutic hypothermia in the most severe cases, there is no proof to date that this treatment is effective and safe in the overall population of cardiac arrest patients. Neither are there any comparative trials establishing the usefulness of emergency percutaneous coronary repermeabilization or goal-directed therapy in successfully resuscitated cardiac arrest patients. These treatments are costly, and many ICUs in Europe and North America refrain from aggressive initial treatments. The development of a severity score for the post-resuscitation phase may help to conduct studies aimed at demonstrating that survival rates in successfully resuscitated cardiac arrest patients are often comparable with those in patients with other critical conditions.

We apologize for the error in Table 4. An erratum will be published to indicate that 127 (60%) should be read instead of 155 (74%) in all patients receiving therapeutic hypothermia.

In brief, we agree with Sunde et al. that no withdrawal decisions should be taken on the basis of any score (including the OHCA score) and that all patients should receive optimal initial post-resuscitation care until a reliable, individual neurological evaluation can be done in order to maximize the patient’s chances of a good outcome. We must avoid confusion between interpreting an estimated probability of mortality and predicting whether or not a given patient will live or die.

References


Corrigendum to: ‘Predicting survival with good neurological recovery at hospital admission after successful resuscitation of out-of-hospital cardiac arrest: the OHCA score’ [Eur Heart J 2006;27:2840–2845]

Christophe Adrie, Alain Cariou, Bruno Mourvillier, Ivan Laurent, Hala Dabbane, Fatima Hantala, Abdel Rhoaou, Marie Thuong, and Mehran Monchi

On page 2843, in Table 4, ‘155 (74%)’ should be read ‘127 (60%)’ in all patients receiving therapeutic hypothermia. The authors wish to apologize for the error.

CD4 + CD25 + regulatory T-cells in acute coronary syndromes

We read with great interest the article by Mor et al. dealing with CD4 + CD25 + regulatory T-cells in acute coronary syndromes (ACS). The authors revealed decreased CD4 + CD25 + T-cell count, foxp3, and CTLA-4 and reduced suppressive function of CD4 + CD25 + T-cells on responder CD4 + CD25 − T-cells in patients with ACS. They also demonstrated increased sensitivity of CD4 + CD25 + T-cells to oxLDL-mediated depletion in cases with ACS. In our opinion, some points of this work are not sufficiently clear.

In Table 1, percentage of diabetic cases was different among groups of ACS (22%), stable angina pectoris (29%), and controls (7%); however, statistical significance of this difference was not given. In the Discussion section, authors state that the number of peripheral CD4 + CD25 + regulatory T-cells has been shown to be reduced in patients with diabetes by citing Kukreja et al. Altered suppressive function of CD4 + CD25 + T-cells in patients with diabetes was also reported. Contrary to these reports, diabetes was not included in the exclusion criteria, and no information was given concerning the adjustment for diabetes despite the fact that the count and functional status of CD4 + CD25 + regulatory T-cells in the study of Mor et al. might have been influenced by the inclusion of diabetic cases.