



## Simple Prediction Tool For Out-Of-Hospital Cardiac Arrest Survivors



Out-of-hospital cardiac arrest is one of the major health problems in the world, with a global incidence of 55 adult out-of-hospital cardiac arrests per 100,000 person-years and a poor survival rate of between 2% and 11%. A recent study aimed to develop an accurate outcome-prediction tool for patients after cardiac arrest. Accurate risk prediction can facilitate conversations with families, enable quality-of-care assessments and improve research due to precise patient stratification.

### Methodology

This retrospective cohort study was based on a cardiac arrest registry. Since 1991 the registry had included more than 4200 patients who were resuscitated following cardiac arrest and who were admitted to the department of emergency medicine at a large university hospital.

The study population included all patients who were successfully resuscitated following out-of-hospital cardiac arrest and who were admitted to the emergency department between 2000 and 2012, a total of 1,932 cases. Older data were not included in order to avoid a bias due to major changes in practice (eg, standard inclusion of therapeutic hypothermia) around the turn of the century.

From the total cases ( $n=1,932$ ), a set of variables established before restoration of spontaneous circulation was explored using multivariable logistic regression. To obtain reliable estimates of the classification performance the patients were allocated to training (oldest 80%) and validation (most recent 20%) sets. The main performance parameter was the area under the ROC curve (AUC), classifying patients into survivors/non-survivors after 30 days. Based on rankings of importance, a subset of variables was selected that would have the same predictive power as the entire set. This reduced-variable set was used to derive a comprehensive score to predict mortality.

### Results And Implications

The average AUC was 0.827 (CI 0.793–0.861) for a logistic regression model using all 21 variables. This was significantly better than the AUC for any single considered variable. The total amount of adrenaline, number of minutes to sustained restoration of spontaneous circulation, patient age and first rhythm had the same predictive power as all 21 variables. Based on this finding, the prediction score was built and had excellent predictive accuracy (the AUC was 0.810), discriminating patients into 10%, 30%, 50%, 70%, and 90% survival probabilities.

In creating this prediction tool, the researchers considered suggested methodological standards for the

development and evaluation of prediction scores. To their knowledge, this is the first out-of-hospital cardiac arrest prediction score that has been developed from such a large cohort and that can be calculated immediately after the restoration of sustained spontaneous circulation without the need for laboratory markers. Patients included in the current study had to survive the initial resuscitation, because the researchers wanted to focus on the post-spontaneous circulation period and not on the resuscitation time-span like other published scores. The fact that only four variables are needed to assess the out-of-hospital cardiac arrest survival probability makes the tool easily applicable and clinically useful.

Previous risk assessments predominantly focused on single factors to predict the survival of out-of-hospital cardiac arrest patients (eg, witnessed or non-witnessed cardiac arrest, bystander cardio-pulmonary resuscitation, age or primary rhythm), but had little impact on individual survival prediction.

The results of the current study are promising to increase prognostication accuracy. The authors are confident that their prediction tool will be helpful in the daily clinical routine.

#### Reference

Aschauer S, Dorffner G, Sterz F, Erdogmus A, Laggner A (2014) [A prediction tool for initial out-of-hospital cardiac arrest survivors. Resuscitation, article in press, published online 21 June.](#)

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