Validation of a Rule for Termination of Resuscitation in Out-of-Hospital Cardiac Arrest

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Background: Several retrospective studies have identified patients with cardiac arrest for whom termination of resuscitative efforts outside the hospital can be considered after resuscitative efforts by paramedics trained and equipped to provide advanced cardiac life support have failed. As a result, guidelines existed for the termination of resuscitation in this setting. Because of a lack of data, similar guidelines have not been developed for use when basic life support is provided by paramedics trained in the use of an automated external cardiac defibrillator. As a result, substantial numbers of patients with little or no potential for survival are regularly transported to emergency departments.

Purpose: To prospectively evaluate a clinical prediction rule to be used by paramedics trained in the use of an automated external defibrillator for the termination of basic life support resuscitative efforts during out-of-hospital cardiac arrest.

Objectives: The primary objective was to validate a previously retrospectively derived clinical prediction rule with a sensitivity of 100% for predicting patients who survive to discharge (the rule recommended termination of resuscitation if there was no ROSC prior to transfer, no shocks delivered prior to transfer, or if the arrest was unwitnessed). The secondary objective was to evaluate whether a response interval of more than eight minutes would increase the predictive power of the rule.

Methods: All patients 18 years and older with an out-of-hospital arrest of presumed cardiac cause treated by paramedics trained in the use of an AED in 12 urban and rural Ontario regions over a 25 month period were included. Patients who received advanced life support, who had a valid DNR, or who had an arrest from an obvious cause (eg. trauma) were excluded. After transfer to the receiving hospital, paramedics completed a data collection form with details of the arrest as well as components of the prediction rule.

Results: 1240 patients were included in the study. For 37 of the 41 survivors, the prediction rule recommended transfer to hospital resulting in a specificity of 90.2%. For 772 of the 1199 patients who died, the rule recommended termination resulting in a sensitivity of 64.4%. The study had a positive predictive value of 99.5%. Of the 4 survivors (representing 0.5% of the total the rule recommended termination, a number considered to be much lower than the threshold of 1% that has be suggested as reflective of medical futility), 3 were considered to have a good cerebral performance. The inclusion of the prespecified variable of a response by EMS personnel in more than eight minutes was associated with a survival rate of 0.3 percent among patients for whom the rule recommended the termination of resuscitation. The addition of this variable to the original prediction rule increased the positive predictive value to 99.7 percent and increased the specificity to 97.6 percent.

Bottom Line: The use of a clinical prediction rule for the termination of resuscitation may help clinicians decide whether to terminate basic life support resuscitative efforts in patients having an out-of-hospital cardiac arrest.