Duration of resuscitation efforts and survival after in-hospital cardiac arrest: an observational study

Zachary D Goldberger, MD, Paul S Chan, MD Prof Robert A Berg, MD, Steven L Kronick, MD, Colin R Cooke, MD, Mingrui Lu, MPH, Mousumi Banerjee, PhD Prof Rodney A Hayward, MD Prof Harlan M Krumholz, MD Dr Brahmajee K Nallamothu, MD

American Heart Association Get With The Guidelines—Resuscitation (formerly the National Registry of Cardiopulmonary Resuscitation) Investigators
†Members listed in the appendix
Published Online: 05 September 2012

Figures

Figure 1

Cumulative proportion of patients achieving return of spontaneous circulation

N=64 339. Overall, 48·5% of the total population achieved return of spontaneous circulation. By 30 min, 42·5% achieved return of spontaneous circulation.

Figure 2

Duration of resuscitation attempts in non-survivors

N=33 141.
Background
During in-hospital cardiac arrests, how long resuscitation attempts should be continued before termination of efforts is unknown. We investigated whether duration of resuscitation attempts varies between hospitals and whether patients at hospitals that attempt resuscitation for longer have higher survival rates than do those at hospitals with shorter durations of resuscitation efforts.

Methods
Between 2000 and 2008, we identified 64 339 patients with cardiac arrests at 435 US hospitals within the Get With The Guidelines—Resuscitation registry. For each hospital, we calculated the median duration of resuscitation before termination of efforts in non-survivors as a measure of the hospital's overall tendency for longer attempts. We used multilevel regression models to assess the association between the length of resuscitation attempts and risk-adjusted survival. Our primary endpoints were immediate survival with return of spontaneous circulation during cardiac arrest and survival to hospital discharge.

Findings
31 198 of 64 339 (48.5%) patients achieved return of spontaneous circulation and 9912 (15.4%) survived to discharge. For patients achieving return of spontaneous circulation, the median duration of resuscitation was 12 min (IQR 6–21) compared with 20 min (14–30) for non-survivors. Compared with patients at hospitals in the quartile with the shortest median resuscitation attempts in non-survivors (16 min [IQR 15–17]), those at hospitals in the quartile with the longest attempts (25 min [25–28]) had a higher likelihood of return of spontaneous circulation (adjusted risk ratio 1.12, 95% CI 1.06–1.18; p<0.0001) and survival to discharge (1.12, 1.02–1.23; 0.021).

Interpretation
Duration of resuscitation attempts varies between hospitals. Although we cannot define an optimum duration for resuscitation attempts on the basis of these observational data, our findings suggest that efforts to systematically increase the duration of resuscitation could improve survival in this high-risk population.