Time to Epinephrine Administration and Survival from Non-Shockable Out-of-Hospital Cardiac Arrest Among Children and Adults

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https://doi.org/10.1161/CIRCULATIONAHA.117.033067
Circulation. 2018;CIRCULATIONAHA.117.033067
Originally published March 6, 2018

Abstract

Background—Previous studies have demonstrated that earlier epinephrine administration is associated with improved survival from out-of-hospital cardiac arrest (OHCA) with shockable initial rhythms. However, the effect of epinephrine timing on patients with non-shockable initial rhythms is unclear. The objective of this study was to measure the association between time to epinephrine administration and survival in adults and children with EMS-treated OHCA with non-shockable initial rhythms.

Methods—We performed a secondary analysis of OHCAs prospectively identified by the Resuscitation Outcomes Consortium (ROC) network from June 4, 2011 to June 30, 2015. We included patients of all ages with an EMS-treated OHCA and an initial non-shockable rhythm. We excluded those with return of spontaneous circulation in < 10 minutes. We conducted a subgroup analysis involving patients < 18 years. The primary exposure was time (minutes) from arrival of the first EMS agency to the first dose of epinephrine. Secondary exposure was time to epinephrine dichotomized as "early" (<10 minutes) or "late" (≥10 minutes). The primary outcome was survival to hospital discharge. We adjusted for Utstein covariates and ROC study site.

Results—From 55,568 EMS-treated OHCAs, 32,101 patients with initial non-shockable rhythms were included. There were 12,238 in the "early" group, 14,517 in the "late" group, and 5346 not treated with epinephrine. After adjusting for potential
confounders, each minute from EMS arrival to epinephrine administration was associated with a 4% decrease in odds of survival for adults, OR = 0.96 (95% CI 0.95, 0.98). A subgroup analysis (n=13,290) examining neurological outcomes showed a similar association (adjusted OR 0.94 per minute; 95%CI 0.89-0.98). When epinephrine was given late compared to early, odds of survival were 18% lower (OR 0.82; 95% CI 0.68-0.98). In a pediatric analysis (n=595), odds of survival were 9% lower (OR 0.91; 95%CI 0.81-1.01) for each minute delay in epinephrine.

**Conclusions**—Among OHCA's with non-shockable initial rhythms, the majority of patients were administered epinephrine > 10 minutes after EMS arrival. Each minute delay in epinephrine administration was associated with decreased survival and unfavorable neurological outcomes. EMS agencies should consider strategies to reduce epinephrine administration times in patients with initial non-shockable rhythms.