Bystander CPR and Out-of-Hospital Cardiac Arrest in Children


ABSTRACT
Researchers from multiple institutions conducted a secondary analysis of the Cardiac Arrest Registry to Enhance Survival, a US registry of out-of-hospital cardiac arrests (OHCAs), to characterize bystander CPR (BCPR) in pediatric OHCAs. All 9-1-1-activated nontraumatic OHCAs, defined as apnea and unresponsiveness in which resuscitation with either CPR or defibrillation was attempted, were included if they occurred in children ≤18 years old from 2013 to 2015. Demographics and arrest characteristics were obtained from the registry.

The primary predictor was BCPR, defined as CPR administered by a layperson. A secondary predictor was type of BCPR, categorized as conventional (compressions plus rescue breaths) or compression only. The primary outcomes were overall survival at hospital discharge and neurologically favorable survival, defined as a Cerebral Performance Category score of ≤2 at hospital discharge. Logistic regression models were used to examine the associations of BCPR and BCPR type and the probability of survival to hospital discharge and neurologically favorable survival after adjusting for potential demographic and arrest characteristic confounders.

The analysis included 3,900 children. Most were <1 year old (59.4%) and female (60.2%) and had nonshockable rhythms (92.2%). BCPR was provided to 46.5% of children, with more white (37.9%) than African-American (24.6%) or Hispanic (10.9%) children receiving BCPR (P < .001). BCPR was also more common in girls, witnessed arrests, arrests with a shockable rhythm, and arrests in which an automated external defibrillator was used. Conventional CPR was used by bystanders with 49.4% of children.

The overall survival rate was 11.3%, and the neurologically favorable survival rate was 9.1%. In multivariable analysis, BCPR was significantly associated with improved overall survival (adjusted odds ratio [OR], 1.57) and neurologically favorable survival (adjusted OR, 1.54) when compared with no BCPR. Both conventional and compression-only BCPR were associated with improved neurologically favorable survival when compared with no BCPR.

The researchers conclude that BCPR, particularly conventional BCPR, results in improved survival in pediatric OHCAs.

COMMENTARY BY
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The American Heart Association recommends conventional CPR for pediatric cardiac arrest, although compression-only CPR is preferable to no CPR at all. The current study is a landmark report of children who experience OHCA, with several key findings in support of these recommendations. Compared to previous reports from the United States, it is promising that almost half (47%) of children received some type of BCPR in the present study. However, concerning racial disparities in BCPR provision were identified, with African-American children significantly less likely to receive BCPR than white children. Importantly, while any BCPR was not associated with survival to hospital discharge or neurologically favorable outcome among infants <1 year, conventional CPR (compared to compression-only CPR) was associated with both of these important outcomes in infants <1 year in multivariable analysis.

Favorable outcomes of conventional CPR compared to compression-only CPR among children have also been reported in literature from Japan. Although CPR quality could not be determined in the present study, the large sample size and careful analysis lend significant support to this practice.

Bottom Line: Due to the strong association between BCPR and survival and favorable neurological outcome among children who experience OHCA, public health efforts to train bystanders to perform CPR should continue, with a focus on minority populations.

EDITORS’ NOTE
We recently reviewed a Japanese study, the results of which purportedly showed no difference in survival or neurological outcome between compression-only CPR and conventional CPR in children with OHCA (AAP Grand Rounds, April 2017;37[4]:144). Lacking randomized controlled studies, we can only conclude that any type of CPR is better than none in pediatric patients with OHCA and reiterate the importance of using available resources to increase public response rate and improve outcomes.

References