Dispatcher-Directed CPR: An All-Ages Strategy to Improve Cardiac Arrest Survival

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Out-of-hospital cardiac arrest is often an unexpected and tragic event. One minute a person is an active participant and the next they are lifeless. Such an event is especially unsettling when it occurs in a young person. There are precious few minutes to restore life following arrest. The circumstances require a coordinated, time-sensitive response that delivers cardiopulmonary support via “CPR.”1 CPR has traditionally included chest compressions alternating with rescue breathing. More recently, evidence from randomized trials has indicated that chest compression alone—“hands-only CPR”—performed by laypersons can provide survival benefit similar to that of conventional CPR among adults who suffer witnessed arrest.2,3

Given the time-sensitive nature of resuscitation, the best chances of survival occur when treatment can be delivered soon after arrest. As a consequence, the goal is to start CPR as soon as possible after arrest. The goal has produced large public health efforts to train laypersons in CPR. These training efforts have produced tangible success and yet bystander (layperson) CPR typically occurs in only a minority of victims of out-of-hospital cardiac arrest.4 This current status quo is not acceptable, and there is a growing appreciation that we need to implement additional strategies to increase bystander CPR.

The emergency medical dispatcher is theoretically well placed to address the challenge. The dispatcher will often be the first professional contact in an arrest. The dispatcher can elicit key information to identify the arrest patient and engage the bystander to provide CPR. Dispatchers prioritize two questions: 1) is the patient conscious? and 2) is the patient breathing normally? The term “normally” is important because it helps distinguish those arrest patients with agonal “breathing”—persons who have suffered cardiac arrest and have reflexive gasping that can be confused with physiologic breathing.5 If the patient is not conscious and not breathing normally, then the dispatcher engages the caller to begin CPR. The strategy is best characterized as “dispatcher-directed” as opposed to “dispatcher-assisted” as the emergency dispatcher takes a leadership role and guides the caller to provide care. The appreciation that the dispatcher can be a critical link has produced a consensus statement and evidence-based metrics that can be used to optimize dispatch involvement in early layperson CPR.6,7 Evidence from diverse settings indicates that this strategy can be successful and improve survival following cardiac arrest.8,9

Although such a strategy holds great promise, the approach—like many in resuscitation—is derived largely from experience and evidence of adult cardiac arrest resuscitation. Whether a particular strategy will translate effectively among children is typically left for bright, dedicated persons to develop consensus from the adult experience.10,11 Pediatric arrest involves distinct circumstances and pathophysiology that may require different approaches or therapies. It is with this appreciation that we welcome the publication by Goto et al in this volume of the Journal of the American Heart Association.12 The investigators conducted a cohort investigation of pediatric cardiac arrest occurring in Japan between 2008 and 2010 using the Japanese national registry to evaluate the role of dispatcher-directed CPR and type-specific CPR (compression alone or compression plus rescue breathing) among pediatric arrest victims.

The study provides useful results, several of which are worthy of particular comment. The investigators observed a temporal increase in layperson CPR during the 3-year study period that was attributable to dispatcher-directed CPR. Perhaps most striking, bystander CPR occurred in more than half of pediatric arrests, with most bystander CPR attributed...
to dispatcher assistance as opposed to bystander CPR without dispatcher assistance. Although one could debate whether the method of ascertainment and classification may have contributed to the large majority classified as dispatcher-assisted, the dispatcher was clearly involved in many cases that received bystander CPR. Collectively, these observations indicate that the dispatcher has a pivotal role in identifying pediatric arrest patients and engaging bystanders to provide CPR. Thus dispatchers and their respective communities have a high-traction opportunity to increase early CPR for all arrest victims—adult or pediatric.

The investigation also highlights the potential to not only increase bystander CPR, but to increase effective bystander CPR for pediatric arrest victims. Dispatcher-directed CPR was associated with greater odds of survival and survival with favorable functional status compared with those who did not receive bystander CPR. Thus “just-in-time” dispatcher CPR enables the bystander to provide CPR that is comparably effective to bystander CPR that does not require dispatcher direction, suggesting that programs of community CPR training and dispatcher CPR instruction are complementary and can each provide survival benefit.

The investigators also observe that the beneficial outcome associated with bystander CPR regardless of dispatcher involvement is specific to conventional CPR that includes both chest compression and rescue breathing. These results support the current international consensus recommendations\(^1\) and American Heart Association Guidelines\(^11\) involving CPR for pediatric victims of cardiac arrest—where the CPR preference is compression plus rescue breathing when possible. Given the distinction between adult and pediatric arrest pathophysiology, the potential added benefit of rescue breathing for pediatrics seems logical.

As with all observational studies, one needs to exercise caution when concluding causal relationships. The investigation by Goto is no different. Although the authors describe in detail how bystander CPR status is determined, additional or different information may be derived if dispatch recordings are reviewed to ascertain the circumstances and details of the arrest.\(^13\) As the authors acknowledge, confounding may be responsible for the findings. There is evidence that indicates survival varies regionally across Japan and the current investigation did not account for regional differences.\(^14\) It may be that systems that provide dispatcher-directed CPR also provide better Emergency Medical Services (EMS) and hospital care. Because there is little information about the specifics of EMS or hospital care, the beneficial association of dispatcher-directed CPR may not be causal but rather just a marker for a system that provides better Emergency Medical Services (EMS) and hospital care.

Finally, an overarching reflection is that the study again underscores the benefits of a national registry. The Japanese initiative continues to be a productive tool for scientific discovery and programmatic improvement. This type of inclusive registry provides for a true population-based assessment of care and outcome for a condition affecting public health. This registry documents and likely is responsible at least in part for the continuous improvement in outcomes that has been observed in out-of-hospital cardiac arrest. Evidence from the registry indicates that the number of survivors has doubled over a 5-year period, translating to thousands of additional lives saved each year in Japan.\(^15\) Such a population-based and comprehensive registry should be the standard in North America and Europe (among others) if we are to advance public health in a progressive manner. There is increasing momentum to achieve such national registries given the success of the Japanese experience.

Pediatric victims of out-of-hospital cardiac arrest can benefit from early bystander CPR, and dispatcher-directed CPR should be an integral part of a comprehensive strategy to treat children and adults who suffer cardiac arrest. The findings from Goto et al. help establish dispatcher-directed CPR as an all-ages strategy to improve out-of-hospital cardiac arrest survival.

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**Disclosures**

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