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Editorial

Improving Cardiac Arrest Resuscitation Outcomes: A Valentine Worth Sending

In the United States, February 14 is Valentine's Day, when expressions of love are sent to those we care about most. The American Heart Association's (AHA's) designation of February as American Heart Month reminds us that we could extend those sentiments beyond a single day by demonstrating how to protect our loved ones from cardiac disease, still ranked as the nation's number 1 cause of death.¹ In recognition of the burden that heart disease represents in our patient populations, this issue of *Critical Care Nurse* is devoted to the topic of cardiac arrest, a challenging condition that teeters its victims between life and death. One of the particularly vexing and long-standing attributes of this disorder is our limited success in prevailing against its potentially ominous outcomes.

Definition of Cardiac Arrest

Cardiac arrest is defined as the abrupt loss of cardiac function in someone who may or may not have a diagnosis of heart disease. It arises instantaneously, often without preceding symptoms,² making it virtually impossible to anticipate and challenging to correctly recognize, manage, and reverse before irreversible and fatal consequences ensue. Although it may arise from a number of distinct etiologies, most cases of cardiac arrest are associated with development of a cardiac arrhythmia, typically ventricular fibrillation.¹

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Survival Rates Remain Disheartening

Each year nearly 568 500 sudden cardiac arrests occur in the United States. Of these, approximately 359 400 (63%) are out-of-hospital cardiac arrests (OHCAs) and 209 000 (37%) are in-hospital cardiac arrests.¹ Of the nearly 360 000 cardiac arrests that happen outside hospitals, 88% occur in the home.³ If effective cardiopulmonary resuscitation (CPR) can be delivered immediately after cardiac arrest, the victim's probability of survival is doubled or tripled.³ However, despite decades of research, the instruction of millions of laypersons and professional health care providers, countless public service announcements, and national programs provided by organizations such as the AHA and American Red Cross, only 32%³ to 40% of OHCAs are responded to with bystander CPR.¹ Among all OHCA victims, only 8%³ to 9.5% survive to hospital discharge.⁴

A few distinctions between out-of-hospital and in-hospital patient populations are worth noting. An OHCA can be defined as "cessation of cardiac mechanical activity that occurs outside of the hospital setting and is confirmed by the absence of signs of circulation."⁵ Although it may develop from a variety of noncardiac etiologies such as trauma or drug overdose, a substantial majority of OHCAs is attributable to cardiac causes.⁵

An in-hospital cardiac arrest occurs in a hospital and typically includes resuscitation efforts such as defibrillation, chest compressions, or both.⁶ As admission to a hospital becomes

more selective based on need for services, in-hospital patients who experience cardiac arrest are likely to be sicker and have more clinically significant comorbidities compared to their neighbors living at home. As a result, despite the greater availability of health care professionals to provide CPR, in-patient cardiac arrest victims may have more clinically advanced systemic disorders that could limit their ability to benefit from CPR.

During the 1990s, reports of survival to discharge rates following in-hospital cardiac arrest and CPR ranged from 7% to 26%.^{7,8} In the United States, the most recent in-hospital cardiac arrest statistics from the Resuscitation Outcomes Consortium Cardiac Epistry and Get With The Guidelines-Resuscitation data show an overall survival rate to hospital discharge for adult victims of cardiac arrest of 23.9%.⁴ For patients in the United Kingdom, the National Cardiac Arrest Audit found an overall survival to hospital discharge rate of 18.4%.⁹ As in the United States, higher rates of survival to hospital discharge are found in patients with shockable rhythms (ventricular fibrillation or pulseless ventricular tachycardia) compared to those with nonshockable rhythms (asystole or pulseless electrical activity).⁹

For patients over 70 years, the chance of survival to hospital discharge following in-hospital CPR ranges at a lower plateau between 11.6% and 18.7%, with declining survival associated with increasing age.¹⁰ Although some improvements in cardiac arrest survival can be noted, the body of research in this area suggests that significant improvements have not yet been realized. Until those advances can be identified to influence clinical practice, critical care nurses might consider making their contributions by pursuing alternative efforts that represent potential inroads toward improving cardiac arrest outcomes.

Critical Care Nurses Can Contribute to Improved Outcomes

Recent research suggests that 2 of the inroads that may lead to better cardiac arrest resuscitation outcomes include doing more and doing less than we are currently doing in managing this condition.

Doing More

The Doing More strategy recognizes that 92% of the 360 000 Americans who suffer an OHCA each year will die, that a majority of those deaths might have been

avoided if timely and effective interventions known to improve survival from cardiac arrest had been provided, and that one of those timely and effective interventions is provision of bystander CPR. As a recent AHA Science Advisory explained,¹¹ OHCA survival rates have increased in communities where bystander CPR participation was expanded. These are especially important initiatives in poor, non-English-speaking, Black, and Latino neighborhoods, where few know how to provide bystander CPR. Instructional and recruitment programs to inform, involve, and teach CPR to residents of these neighborhoods could launch lifesaving efforts with immediate impact.

Doing Less

As in many aspects of life, doing less at times yields more. Two approaches to doing less with resuscitation for cardiac arrest suggested by recent literature include focusing on immediate and effective provision of Basic Life Support (BLS) rather than delaying or interrupting that to provide Advanced Life Support (ALS) and teaching laypersons to perform chest compressions-only CPR rather than standard CPR that includes intermittent breaths.

An intriguing study reported by Sanghavi and colleagues¹² at Harvard University used a nationally representative sample of Medicare beneficiaries from nonrural areas of the United States that included 1643 patients managed with BLS and 31 292 managed with ALS. The researchers concluded that OHCA patients had higher survival at discharge (BLS 13.1% vs ALS 9.2%, 95% CI, 2.3-5.7), higher survival at 90 days (BLS 8.0% vs 5.4% for ALS; 95% CI, 1.2-4.0), and lower rates of poor neurological functioning (BLS 21.8% vs ALS 44.8%; 95% CI, 18.6-27.4) when they received only BLS rather than ALS from emergency medical services. These results need to be interpreted with caution (the ALS was provided by emergency medical services staff rather than hospital physicians or nurses, the timing of initiation of either form of resuscitation is not included in data, data rely on billing record rather than clinical documentation of measures provided, and ALS is usually preceded by BLS, so it is not clear how those influences were distinguished to capture measurement of ALS alone, some patients require the medications, equipment, and therapies reserved for ALS) to ensure

that the methodology and analysis are sufficiently vetted and not found wanting. Despite that customary admonition, the results are thought-provoking and worthy of further consideration and repeat testing.

A second avenue of Doing Less involves the use of compression-only CPR in place of traditional CPR procedures that include intermittent use of mouth-to-mouth breaths. Since the AHA updated its CPR guidelines in 2005 to recommend use of chest-compression CPR by untrained rescuers as well as in dispatcher-assisted CPR in an effort to expand the quality and provision of bystander CPR, a number of reports^{13,14} have heralded support for compression-only CPR (hands-only) as an effective form of CPR with survival outcomes comparable to those of conventional CPR. Additional studies¹⁵ have noted better neurological outcomes at 1 month with hands-only CPR compared to conventional CPR when hands-only CPR is combined with public-access automated external defibrillators. More recently, a meta-analysis of studies including more than 92 000 adult patients with OHCA further supported the efficacy of hands-only CPR in producing survival rates comparable to those achieved with conventional CPR for patients whose arrest was of cardiac etiology.¹⁶

Because nearly 90% of cardiac arrests occur within the home, most of us will encounter victims who are family members, close friends, or neighbors, as stated by the AHA mantra: “The life you save with CPR is mostly likely to be someone you love.”³ For those of us already thoroughly trained and certified to provide lifesaving resuscitation, our ability to respond to that emergency is automatic, immediate, and competent. In addition, critical care nurses could join with colleagues in home health, school and community health, and numerous other surrounding organizations to instruct and empower residents in our neighborhoods, schools, communities, places of worship or recreation, towns or cities to serve their own loved ones as bystander-CPR providers. Sending them a text, e-mail, tweet, card, or brochure that reads “If you love someone, learn how to save their life” and invites them to see the brief video of how easily and quickly they can learn hands-only CPR¹⁷ can represent the best valentine’s gift they ever received. Critical care nurses can do that. We know you can.

Join the Conversation

If you can suggest other strategies for improving patient outcomes following cardiac arrest, please send them to us at ccn@aacn.org so *Critical Care Nurse* can share these with our readers. CCN



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