

CARDIO CEREBRAL RESUSCITATION

Mr. Manjunath Beth

Maniba Bhula Nursing College, Gopal Vidyanagr, Tarsadi, Bardoli, Surat, Gujarat

ARTICLE INFO

Article History:

Received on 25th Jan 2018

Received in revised form: 26th Feb. 2018

Accepted on : 30th March 2018

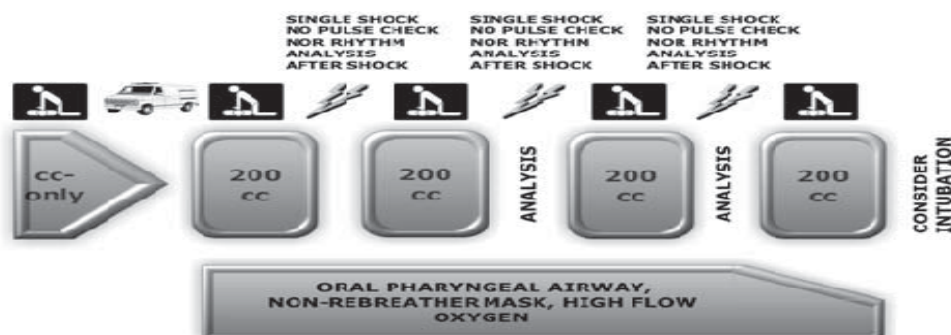
Published online: 5th April 2018

ABSTRACT

CCR saves more lives! In the absence of early defibrillation by AEDs, survival of patients with out-of-hospital cardiac arrest (OHCA) treated per American Heart Association guidelines. Cardio Cerebral Resuscitation (CCR) is a new approach to patients with out-of-hospital cardiac arrest that has been shown to improve rates of neurologically intact survival by 250%–300% over the approach advocated by the 2000 American Heart Association (AHA) guidelines.

Key Words:

CCR, AFD, OHCA, ACLS, CPR, AHA



Copyright © UTUJAH1 2018 : Manjunath Beth. This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Introduction:

“If there is no air, no living beings, if there is no living beings, no life” - Smith George

Cardio Cerebral Resuscitation (CCR) is a new approach to patients with out-of-hospital cardiac arrest that has been shown to improve rates of neurologically intact survival by 250%–300% over the approach advocated by the 2000 American Heart Association guidelines. And EMS systems can realize these improvements without having to buy a single new gadget or device. CCR consists of three major components:

- ♦ Continuous chest compressions (CCC) without mouth-to-mouth ventilation for all bystanders of witnessed cardiac arrests and for first responders.
- ♦ A new advanced cardiac life support algorithm that delays endotracheal intubation, emphasizes minimal interruptions of chest compressions, deemphasizes positive-pressure ventilations, prioritizes defibrillation according to the three-phase time-sensitive model of ventricular fibrillation, and encourages early administration of epinephrine. Cardio cerebral resuscitation is also for basic

EMTs—they, too, should deliver continuous chest compressions at a rate of 100 per minute. Invasive airway insertion is delayed, and positive-pressure ventilations are not utilized during the initial minutes of resuscitation. Epinephrine, when appropriate, is administered via IV or IO ASAP when paramedics arrive.

- ♦ The newest component of cardio cerebral resuscitation is advocating the establishment of cardiac arrest centers that can provide optimal care that includes urgent cardiac catheterization, controlled mild therapeutic hypothermia and standardized supportive care for patients in coma after resuscitation from cardiac arrest.

Why “CARDIO CEREBRAL RESUSCITATION” instead of standard CPR and ACLS?

It saves more lives! In the absence of early defibrillation by AEDs, survival of patients with out-of-hospital cardiac arrest (OHCA) treated per American Heart Association guidelines has, since their introduction in 1974, been poor in most of the world. It has not significantly improved in spite of updated

standards and/or guidelines in 1980, 1992 and 2000, despite millions of dollars and man-hours spent in development, training and implementation. While we are intellectually convinced that CCR is now the optimal approach to patients with out-of-hospital cardiac arrest, the greatest proponents are providers in systems that have adopted CCR. CCR was instituted in Tucson, AZ, in 2003; in Rock and Walworth Counties, WI, in 2004; in metropolitan Phoenix in 2005 and across Arizona thereafter; and in Kansas City, MO, in 2006 and Kansas City, KS, in 2007. Providers in these communities have viscerally experienced the improved results.

In 2008, CCR was instituted in other areas of Wisconsin. Darren Bean, MD, an emergency physician in Madison, reported that, "We have had four survivors in the past 14 days, one of whom had 43 minutes of refractory VF prior to ROSC. To our collective disbelief (even the most enthusiastic supporters of CCR have difficulty believing that 43 minutes of low-flow state could result in anything other than neurologic devastation), he awoke with a completely normal neurologic outcome."

CCR FOR BYSTANDERS: We were delighted that the AHA recently advocated "hands-only" or "compression-only" CPR for bystanders of witnessed arrests. We have been advocating this approach for years. However, we do not think the AHA recommendations go far enough, as they state that trained individuals should still utilize the 30:2 compression-to-ventilation ratio if they believe they can perform the ventilations with minimal interruptions of chest compressions. While ventilations are probably necessary in unwitnessed cardiac arrests, patients with witnessed arrests do not initially need assisted ventilation because their arterial oxygen content is sufficient for several minutes of chest compression-only CPR. In subjects who gasp, the arterial oxygen content remains adequate for up to 15 minutes with chest compressions only. Because the perfusion of the brain and heart are so marginal during resuscitation efforts, interrupting or delaying chest compressions for ventilation or other interventions, except for defibrillation, is deleterious. If there is more than one person on scene, should one of the rescuers do assisted ventilations while the other does CCC? Surprisingly, the answer is no. With normal ventilation, breathing results in a negative pressure inside the chest that not only causes air to enter the lungs, but enhances blood return to the heart as well. This negative intrathoracic pressure also improves cerebral blood flow. On the other hand, when one ventilates a patient with cardiac arrest, one is increasing the pressure inside the chest, decreasing blood return to the chest and decreasing blood flow to the brain. This is in stark contrast to respiratory arrests, such as drowning, where continued normal cardiac output in the face of inadequate oxygen results in rapid depletion of arterial oxygen content, leading to hypotension and, finally, secondary cardiac arrest. Here ventilatory support is clearly needed, and until better information is available, the AHA's 30:2 ratio is recommended. One reason the guidelines have not, until now, advocated different approaches to cardiac and respiratory arrests was the assumption that lay individuals could not tell the difference between them. It is important, in your training of the

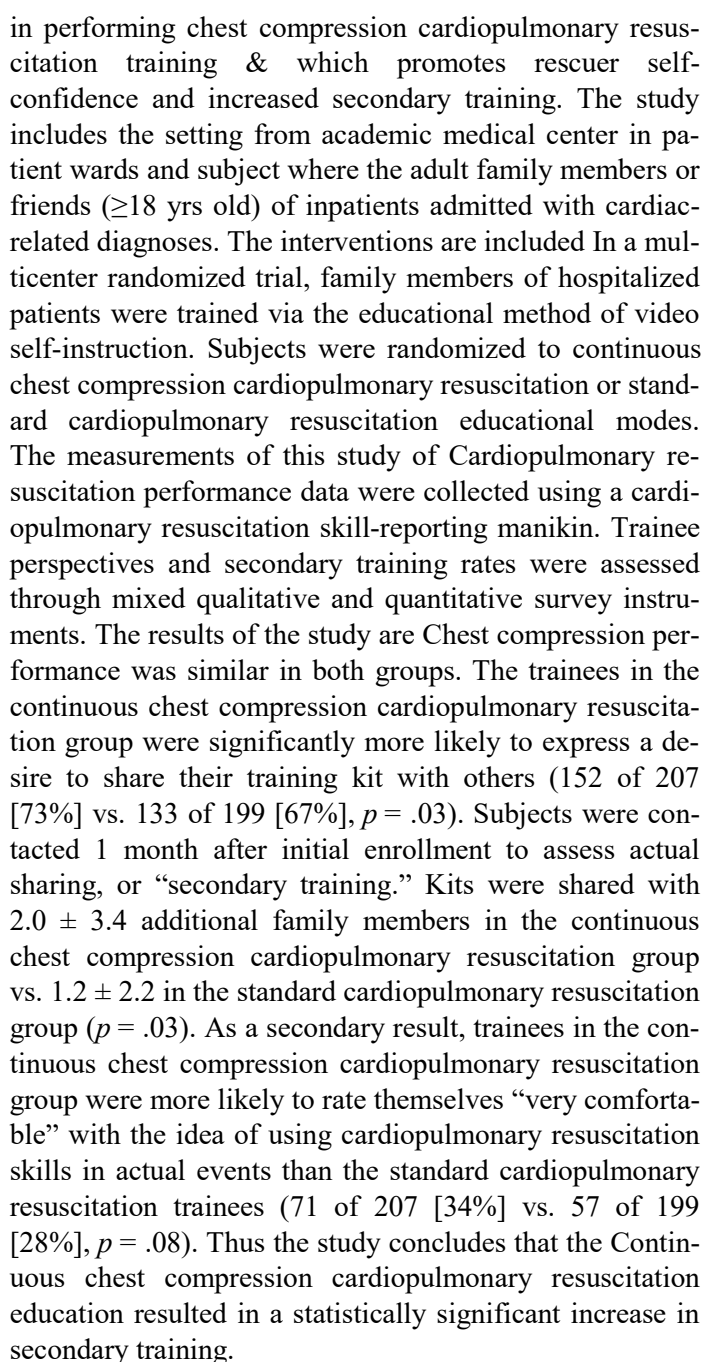
public, to emphasize that any person who collapses suddenly, is not responsive and is not breathing normally is indeed a cardiac arrest victim. Be sure to emphasize that there are two types of abnormal breathing: gasping (snoring or agonal respirations), and not breathing at all. Many subjects with witnessed arrests will continue to gasp and provide physiologic ventilation—that is, ventilation with decreased intrathoracic pressures—so that assisted positive-pressure ventilation is not necessary. Or, if allowed, they will begin gasping with CCC CPR.

CCR FOR EMS: The cardio-cerebral resuscitation protocol (*Figure 1*) is reserved for cases in which an out-of-hospital arrest is presumed to be cardiac in origin—i.e., individuals with sudden, unexpected collapses with absent or abnormal breathing. In all other situations, AHA guidelines for ACLS should still be used. EMS should give 200 uninterrupted chest compressions (100 per minute) before each rhythm analysis and single shock, if indicated, followed immediately by another 200 chest compressions and repeat rhythm analysis. Patients are not moved from the scene until three cycles of 200 compressions/rhythm analysis. In most cases they are not transported until they are resuscitated or pronounced dead. Initial airway management is delayed until a second rescuer is available and is initially limited to placement of an oral-pharyngeal airway and administration of oxygen by non-rebreather mask. Insertion of an invasive airway and assisted ventilation are not performed until either return of spontaneous circulation or after three cycles of chest compressions, analysis and, when needed, shock. Most who have ROSC are intubated prior to transportation. When positive-pressure ventilations are delivered, it was initially recommended that they be limited to a rate of 8–10 per minute. There is good evidence that this should be as few as six. The technique of chest compressions is ideally performed with a metronome attached to the defibrillator to emphasize the importance of a rate of 100 per minute. Full chest recoil after each compression is essential. If only one responder is on scene, the defibrillator or AED pads are applied before chest compressions are initiated in an effort to minimize the pause between stopping compressions and the defibrillation shock. For CCR, AEDs need to be reprogrammed, or their voice instructions ignored.

SUPPORTING LITERATURE:

To date there have been four formal publications of outcomes using cardio cerebral resuscitation.

1. The first was from Wisconsin, where survival during the first year of CCR was compared to the previous three years of CPR per the 2000 guidelines. Neurologically normal survival of witnessed arrests with shockable rhythms tripled, from 15% to 45%.
2. The second was from Arizona, including cities in the Phoenix metropolitan area; there survival of such patients more than tripled, from 5% to 18%.
3. The third was a three-year follow-up of the Rock and Walworth County results, in which survival increased from 15% to 40%, including one patient who received post-resuscitation hypothermia.
4. A prospective, multicenter cohort study was conducted to explore nurses' knowledge and competence



1. Kellum MJ, Kennedy KW, Ewy GA. Cardiocerebral resuscitation improves survival of patients with out-of-hospital cardiac arrest. *Am J Med* 119:335–40, 2006.
2. Bobrow BJ, Clark LL, Ewy GA, et al. Minimally interrupted cardiac resuscitation by emergency medical services providers for out-of-hospital cardiac arrest. *JAMA* 229:1,158–65, 2008.
3. Kellum MJ, Kennedy KV, Barney R, et al. Cardiocerebral resuscitation improves neurologically intact survival of patients with out-of-hospital cardiac arrest. *Ann Emerg Med* 2008,
4. Aufderheide TP, Lurie KG. Death by hyperventilation: A common and life-threatening problem during cardiopulmonary resuscitation. *Crit Care Med* 32:S345–51, 2004.
5. Weisfeldt M, Becker L. Resuscitation after cardiac arrest: A 3-phase time-sensitive model. *JAMA* 288:3,035–38, 2002.
6. Ewy G. Cardiocerebral resuscitation: The new cardiopulmonary resuscitation. *Circ* 111:2,134–42, 2005.
7. Ewy GA. Cardiology patient page. New concepts of cardiopulmonary resuscitation for the lay public: Continuous-chest-compression CPR. *Circ* 116:e566–68, 2007.
8. Ewy GA. Cardiac arrest—guideline changes urgently needed. *Lancet* 369:882–84, 2007.
9. Gordon A. Ewy, MD, is chief of cardiology and director of the University of Arizona Sarver Heart Center at the University of Arizona College of Medicine in Tucson, AZ.
10. Michael J. Kellum, MD, is the EMS medical director for Mercy Health System in Janesville, WI.
11. Bentley J. Bobrow, MD, is assistant professor of emergency medicine at the Mayo Clinic College of Medicine and an emergency physician at the Mayo Clinic Hospital in Scottsdale, AZ.