

## **Cardiac Arrest 2009**

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The pace of advancement of medical knowledge on the treatment of Sudden Cardiac Arrest has accelerated exponentially. We have learned a great deal since the publication of the 2005 AHA Guidelines that will not officially appear for almost another 2 years – until November 2010.

The Chain of Survival has been expanded to recognize that sudden cardiac arrests are usually not sudden – and are most commonly due to an acute myocardial infarction. They can often be prevented if patients recognize the symptoms of a heart attack and call 9-1-1 before suffering the cardiac arrest. The Chain also now recognizes that post-resuscitation hospital care can affect outcome. Specifically, PCI, hypothermia, glycemic control, and seizure prevention improve neurologically intact survival.

Rapid care, through streamlined processing of a 9-1-1 call, bystander CPR, and dispatcher-assisted CPR, can help protect the heart and brain before arrival of EMS. The most important functions of EMS are high-quality uninterrupted chest compressions and prompt defibrillation. Chest compressions are performed poorly by most laypersons and professional healthcare providers. Chest compressions can be optimized in 3 ways – mechanical CPR, feedback-enhanced CPR, and improved training. Only improved training ensures availability of good CPR system-wide to all patients by all responders. The Ambu SmartMan uses visual feedback to optimize training and performance, and can improve performance of ventilations as well.

A three-phase model has been proposed to describe treatment for ventricular fibrillation. The first five minutes is the electrical phase and requires immediate defibrillation. Between 5 and 15 minutes during the circulatory phase, two minutes of effective CPR should be performed before defibrillation. After 15 minutes is the metabolic phase and survival is poor. Hypothermia may be helpful.

Advanced care may help some patients, though are secondary to CPR and defibrillation in importance. Epinephrine and vasopressin may improve outcomes though more data are needed. Amiodarone has not been shown to improve survival to discharge.

The effectiveness of all of the above measures can only be evaluated by measuring the final goal – to increase the percentage of patients who are discharged from the hospital with full neurological function. CARES ([mycares.net](http://mycares.net)) is a national effort to measure and benchmark EMS systems nationwide. Ongoing improvement efforts must be guided by these data.