# Sudden Cardiac Arrest and the Use of Automated External Defibrillators (AEDs)

Posted in Issues In Safety & Rescue by Gerald M. Dworkin

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The following information was extracted from the Medtronic Physio-Control website at www.aedhelp.com, and is posted on our website to educate Aquatic Recreation Agencies, Beach Patrols, Lifeguard Organizations, Aquatic and Fitness Facilities, and Public Safety and Rescue Organizations on the use of Automated External Defibrillators (AEDs).

What is sudden cardiac arrest?

More aptly called sudden cardiac death, sudden cardiac arrest is a condition in which the heartbeat stops suddenly and unexpectedly. It is caused by life-threatening arrhythmias, abnormalities in the heart's electrical system. The most common arrhythmia is ventricular fibrillation. In this condition, the heart beats so chaotically that it's unable to pump blood to the body and brain.

The sudden cardiac arrest victim first loses his or her pulse, then consciousness, and finally the ability to breathe. Without immediate treatment, the victim almost always dies.

Sudden cardiac arrest vs. heart attacks

A sudden cardiac arrest is not the same thing as a heart attack, although a person suffering a heart attack is more likely to develop abnormal heart rhythms and sudden cardiac arrest. Here's how they're different:

A heart attack is caused by blocked blood flow to the heart muscle so the muscle begins to die. Sudden cardiac arrest is caused by an abnormal heart rhythm. A heart attack is often preceded by chest, arm, upper abdomen, or jaw pain. Nausea and sweating are common. There is rarely a warning before sudden cardiac arrest. Heart attack patients usually remain conscious. Sudden cardiac arrest victims always lose consciousness.

The prevalence of sudden cardiac arrest

One of the leading causes of death among American adults, sudden cardiac arrest kills approximately 350,000 people a year, or approximately 1,000 people per day. Two out of every three deaths happen outside of the hospital.

Who's at risk and where:

Sudden cardiac arrest is unpredictable and can happen to anyone, anywhere—even to a child. Risk increases with age. Although pre-existing heart disease is a common cause of cardiac arrest, many victims have never

had any heart problems.

Early defibrillation is the key to survival

The only effective way to treat cardiac arrest is with a defibrillator, a medical device that delivers an electrical current, or shock, through the chest to the heart. This shock — or countershock as it is sometimes called — interrupts the random electrical pulses of ventricular fibrillation and gives the heart a chance to start beating again in a normal rhythm. The process is called defibrillation.

If you've watched ER, or any other TV hospital show, you've probably seen a doctor or nurse successfully shocking a cardiac arrest victim back to life with a defibrillator. Unfortunately, in the real world, 95 percent of cardiac arrest victims die because they either don't have access to defibrillation, or if they do, it's delayed by 10 minutes or more.

That's why the American Heart Association advocates for the widespread public use of AEDs. Early defibrillation could save up to 100,000 lives per year in America.

Survival odds

Cardiac arrest is usually reversible if defibrillation occurs within the first few minutes after collapse. The sooner the shock is delivered, the better.

As many as 50 percent of cardiac arrest victims could be resuscitated if they were defibrillated within seven minutes or less. In one study in Las Vegas, survival rates reached 70 percent. (Rapid Defibrillation by Nontraditional Responders: The Casino Project; T.D. Valenzula, et. al, Academic Emergency Medicine; May 1998, Vol. 5/No. 5, pg. 414.) Survival can be as high as 90 percent if a victim is defibrillated during the first minute after collapse.

Each minute defibrillation is delayed, the chance of a person surviving a cardiac arrest drops 10 percent — even if CPR is started immediately.

If a sudden cardiac arrest victim isn't defibrillated within 10 minutes, his or her chance of survival is less than 2 percent. The chance of survival will drop even further if CPR isn't begun before the defibrillator arrives. If the heart isn't restarted within the first four to six minutes after the arrest, the victim may sustain irreversible brain damage.

The Chain of Survival

In 1990, the American Heart Association introduced a treatment model for victims of sudden cardiac arrest called the Chain of Survival. It outlines the specific sequence of events that need to happen for a victim to survive and recover from sudden cardiac arrest.

Early Access. Someone suspects or determines the victim is in sudden cardiac arrest and calls for help.

Early CPR. Someone trained in cardiopulmonary resuscitation keeps the victim's blood flowing until defibrillation can begin.

Early Defibrillation. Someone trained in defibrillation shocks the victim as quickly as possible.

Early Advanced Care. Medical personnel provide advanced cardiac care which can include airway support, medications, and hospital services.

Studies show that the most critical link in the chain is defibrillation.

CPR increases the odds

CPR, or cardiopulmonary resuscitation, is a crucial part of the Chain of Survival. An emergency procedure, CPR is used when someone stops breathing or his or her heart stops. As with defibrillation, anyone can learn to perform this simple procedure.

The person trained in CPR uses a combination of chest compressions and mouth-to-mouth or mouth-to-mask resuscitation to circulate oxygenated blood to the victim's heart and brain.

CPR can double a sudden cardiac arrest victim's chance of survival if it's begun before defibrillation.

How an AED works

An AED, or automated external defibrillator, is a portable and easy-to-use medical device designed especially for first responders with little training. A first responder is the one most likely to arrive first to the scene of a medical emergency.

An AED has a built-in computer that analyzes a victim's heart rhythm and determines if it requires a shock. Unlike a manual defibrillator, an AED is simple to use because voice commands and screen messages guide the operator through the defibrillation process.

No medical background needed to use an AED.

AEDs are extremely intuitive and most people can learn to operate an AED with a few hours of training. In fact, the American Heart Association says "Learning to use and operate an AED is easier than learning to perform CPR.

How to use an AED

A sophisticated medical device that's simple to use, the AED leads the operator through the rescue process step by step. Once the operator has confirmed the victim is unresponsive, not breathing, and has no pulse:

1. The operator turns on the AED.
2. The operator attaches the adhesive electrodes to the victim's chest. The machine assesses and then interprets the victim's heart rhythm.
3. The operator follows the machine's voice prompts and screen instructions.

If a shock is advised, the voice prompts will tell the operator to press the "SHOCK" button. The AED will not allow a shock to be given unless the victim needs it.

Why EMS and CPR are not enough

Emergency medical service (EMS) professionals and firefighters save many thousands of lives a year, but they could save even more if they weren't impeded by the time it takes to reach a victim or a lack of

equipment. Nothing could be truer when it comes to victims of sudden cardiac arrest.

Less than half of first responding emergency vehicles currently carry defibrillators, the only device that can reverse sudden cardiac arrest. Without a defibrillator on hand, these first responders have to rely on getting to the victim and on to the hospital in less than 10 minutes. That's usually not possible.

EMS is sometimes delayed

In some large metropolitan areas, the ambulance can't even get to the scene of the attack in 10 minutes because of traffic. So, even if an emergency responder does have a defibrillator, the response time might not be fast enough to save the victim's life.

"Even in the best EMS systems, it takes professional rescuers four to eight minutes to arrive at the scene," says Mary Fran Hazinski, R.N., M.S.N., chairperson of the American Heart Association's ECC. "During these precious moments, the victims' chances of survival are dwindling."

CPR cannot restart a heart

Finally, CPR is an important link in the Chain of Survival, but it can't save someone from sudden cardiac arrest. It buys a little bit of time for the victim, but only defibrillation has the potential to actually save the victim's life.

AEDs in the workplace and community: A growing trend

Ever since Medtronic Physio-Control pioneered the use of portable defibrillators for healthcare professionals 30 some years ago, there has been a steady increase in defibrillator awareness and use across the country. Now, Medtronic Physio-Control has introduced a new class of portable lightweight, modestly priced, automated defibrillators anyone can learn to use. As a result, public advocacy groups such as the American Heart Association and the American Red Cross are campaigning for greater access to these simple defibrillators and helping to change the laws governing their use.

Today, many more organizations are taking action to protect their people from the threat of cardiac arrest. They're installing AEDs everywhere large groups gather, from convention centers and shopping malls to factories and theme parks. In fact, some people predict that AEDs may eventually become as commonplace as fire extinguishers and first aid kits.

Legal questions

As is common with life-saving devices, AEDs are regulated by a number of laws and regulations. Some states have specific requirements for AED use such as CPR training; other states restrict who can use the devices. Because these laws vary so much from state to state and are continually evolving, it's best if you contact your state office of Emergency Medical Services for the most current information in your locale.

Health experts support expanded AED use

Here are a few of the many health advocacy groups that promote expanded AED use:

The International Liaison Committee on Resuscitation

"To achieve the earliest possible defibrillation, the International Liaison Committee on Resuscitation (IlCOR) endorses the concept that, in many settings, nonmedical individuals should be allowed and encouraged to use defibrillators."

"Automated external defibrillation is one of the most promising methods for achieving rapid defibrillation. In public access defibrillation, the technology of defibrillation and training in its use are accessible to the community."

The American Heart Association

The American Heart Association is a good place to turn for current legislative news. This organization is working with states to ensure that laws give immunity for AED operators, owners, and trainers. In recent years, many states have adopted legislation in support of expanded AED use. Some states, for example, have laws that provide immunity from civil liability for lay AED users who have been trained in a state-approved training program.

Another Web site with current legislative information is one produced by PADL, The Public Access Defibrillation League.

In addition to state legislation, the U.S. federal government also regulates AED use. "Challenging Sudden Death: A Community Guide to Help Save Lives" has helpful information about federal laws.

Is liability a concern?

Some companies, considering an AED program for the first time, may wonder about liability. Yet, some legal experts advise that having an AED could actually reduce a company's risk of liability. Indeed, rapid access to defibrillation is becoming a safety standard in some industries.

"In most settings, the medical benefits of AEDs far outweigh any legal risks," counsels Richard A. Lazar, an attorney in the field. "As these devices become more widely used, there will potentially be greater liability risk for not adopting AED programs."

Physio offers indemnification programs

If liability is a concern for non-hospital, non-emergency services personnel, you may be pleased to note that Medtronic Physio-Control offers a choice of indemnification programs.

The Standard Indemnification Program is included with the purchase of every AED at no extra charge. The optional Gold Plan is available for a moderate fee. It indemnifies the customer from any AED-related liability claims — for proper and improper use — as long as he or she meets the terms of the agreement. The plan also includes periodic inspection of the devices. The only exception to coverage is if the user intentionally misuses the device or is grossly negligent.

LifeNet MD Medical Assistance Plan

Documentation of a prescription for the use of an AED is requirement prior to shipment to a commercial customer. This requirement is satisfied by LIFENET MD. Since many commercial operations don't have a licensed physician on staff. LIFENET MD provides the medical authorization required to implement an AED program.

Enrolling in LIFENET MD is like adding licensed physicians to your staff – and medical consulting support is available 24 hours per day, 365 days a year for the low price of $450 (per AED, covers a five-year period).

Registration with LIFENET MD is simple. The application form provides the LIFENET MD medical team important information about how the proposed AED program will be implemented. International Medical Consulting, Inc. (IMC) is the provider of the medical services under the LIFENET MD program. The team at IMC will review the application and may suggest changes if appropriate. Approved applications are faxed or mailed back to the sales representative. Sales representatives submit a Purchase Order for LIFENET MD with the approved application in order for this plan to be activated. If a customer desires to cover multiple AEDs, an equal number of LIFENET MD plans must be ordered.

Upon approval, IMC will issue a "Certificate of Medical Direction and Control." If purchased in conjunction with a LIFEPAK 500 AED, the certificate will be issued upon shipment of the AED.

For more information on the LIFENET MD program, information is available at http://www.aedhelp.com or http://www.medicalconsulting.net.