

TerranearPMC Safety Share

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I recently became a certified instructor for first aid/CPR and AED use. As part of my instructor's course, film clips were presented that illustrated various scenarios of different types of medical emergencies. In every display the qualified individual appears on the scene and takes control of the situation by first assessing the injured person, followed by instructing bystanders to "Call EMS and get a first aid kit and AED!" I couldn't help but ask myself, "how many people would understand what was being requested?" EMS is the acronym for "Emergency Medical Services." For the layperson, that means dialing "911." If you are using a cell phone that has an area code that is not in the location of the emergency, chances are you will be connected to emergency services in your area code; NOT in the area/city where the emergency response is needed. Therefore, it is important to let the person on the other end of your call know where the emergency is occurring. Fortunately, today, by merely stating your location (city, town, etc.) you will be instantly connected to the emergency services of your location. Above all, never end the call until the emergency dispatcher lets you know that you can hang up.

OK, calling 911 can be easily performed, especially today, with the abundant accessibility of smart phones. Because of this technology, attending to a person needing medical attention and simultaneously calling for emergency medical care is feasible (as opposed to decades ago, when all that was available were pay phones and landlines. Aside from calling 911, obtaining a first aid kit as well as an AED (the acronym for automated external defibrillator) may be "easier said than done," as these items are not always immediately available. And even if these items are stored nearby, it seems that most people do not know where they are located. Therefore, it is important that everyone take the time to note their location.

Such supplies can be beneficial in medical emergencies; especially the AED, as this piece of equipment can be a life saver. The fact is, for every minute that applying CPR and using an AED is delayed, the chances of survival diminish by 10%. AEDs are very easy to use and the United States has included using AEDs by lay-persons as "good faith" and therefore applicable by any person under Good Samaritan laws. "Good faith" protection under a Good Samaritan law means that a volunteer responder (not acting as a part of one's occupation) cannot be held civilly liable for the harm or death of a victim by providing improper or inadequate care, given that the harm or death was not intentional, and the responder was acting within the limits of their training and in good faith.

AEDs are generally either kept where health professionals and first responders can use them as well as public places including corporate and government offices, shopping centers, restaurants, public transport, and any other location where people may congregate. To make them highly visible, public access AEDs are often brightly colored and are mounted in protective cases near the entrance of a building. When these protective cases are opened, or the defibrillator is removed, it is not uncommon for a buzzer to alert nearby staff, although this does not necessarily summon emergency services. In September 2008, the International Liaison Committee on Resuscitation issued a 'universal AED sign' to be adopted throughout the world to indicate the presence of an AED. This universal sign is presented below:



A defibrillator delivers a dose of electric current (often called a countershock) to the heart. This countershock depolarizes a large amount of the heart muscle. Subsequently, the sinoatrial node (or SA node) of the heart is able to re-establish a normal rhythm (therefore, the SA node is often referred to as the body's natural pacemaker). The SA node is a group of cells located in the wall of the right atrium of the heart. These cells have the ability to spontaneously produce an electrical impulse that travels through the heart via the electrical conduction system causing the heart to contract. In a healthy heart, the SA node continuously produces an action potential (voltage), setting the rhythm of the heart. The rate of action potential production (and therefore the heart rate) is influenced by nerves that supply it.

AEDs are typically used to treat ventricular tachycardia and ventricular fibrillation. In each of these two conditions, the heart is electrically active, but produces a dysfunctional pattern that does not allow it to pump and circulate blood. In ventricular tachycardia, the heart beats too fast to effectively pump blood. Ultimately, ventricular tachycardia leads to ventricular fibrillation. In ventricular fibrillation, the electrical activity of the heart becomes chaotic, preventing the ventricle from effectively pumping blood. The fibrillation in the heart decreases over time and will eventually reach asystole. That is, the absence of ventricular contractions. Asystole is the most serious form of cardiac arrest and is usually irreversible.

AEDs are designed to be used by laypersons who ideally should have received AED training, such as first aid, certified first responder, and basic life support (BLS) level cardiopulmonary resuscitation (CPR) classes.

It was in 1899 when defibrillators (not automated external devices) were first demonstrated by two physiologists from Switzerland at the University of Geneva, that small electrical shocks could induce ventricular fibrillation in dogs, and that larger charges would reverse the condition. In 1930, this phenomenon was used to study the relationship between electric shocks and its effects on the human heart, which led to the invention of a device used for external "jump-starting" the heart. The first use of an external defibrillator on a human was in 1947. And by the 1965 a portable version was invented. This device was initially installed in ambulances in Belfast, Ireland. It weighed 70 kg and operated from car batteries. Only a few years later, in 1968 this machine was redesigned, weighing only 3 kg and incorporated a miniature capacitor that was first manufactured for NASA.

An AED discharges electrical energy. And quite a bit. The fact is an AED delivers a 3000-volt charge in less than 0.001 seconds. Thus, it important that persons be trained to safely use an AED. Like any piece of medical equipment or procedure, improper use can result in more than just being ineffective; improper use could prove to be hazardous.

As a final point, AEDs are designed to address situations of cardiac arrest – NOT heart attacks. These are two very different conditions. During a heart attack the person is conscious and if left untreated, can lead to cardiac arrest. During cardiac arrest, the person has become unconscious and needs immediate medical attention. Therefore, AEDs are important as they can provide an immediate life-saving jump start while professional medical services arrive on the scene.

Why shouldn't truth be stranger than fiction? Fiction. after all has to make sense - Mark Twain

