

Academic Research Paper

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Abstract

Cardiac arrest is a medical condition that will lead to sudden cardiac death if not reversed. During cardiac arrest the heart suddenly stops contracting effectively, and breathing ceases. If the victim is not emergently treated the resulting outcome is death. Cardiopulmonary resuscitation or CPR is a combination of rescue breathing (mouth-to-mouth resuscitation) and chest compressions. With proper CPR technique, the chance of survival from cardiac arrest is greatly improved. Medical professionals and emergency workers are trained to perform proper CPR. However, many people with no medical background are also certified to perform CPR in a life threatening emergency. Time is of the essence for victims of cardiac arrest, the more people that understand how to properly perform CPR, the better the outcome will be.

Cardiac Arrest and resuscitation

There are over 300,000 cardiac related deaths per year. Fifty percent of cardiac death fatalities result from sudden cardiac death. Eighty percent of cardiac deaths have underlying coronary artery disease (CAD). Structural abnormalities that can lead to cardiac arrest and then death include CAD, left ventricle hypertrophy, myocarditis, cardiomyopathies, electrical abnormalities, decreased ejection fraction, heart failure, acute myocardial infarctions, and the chaos theory. The most common underlying reason for patients to die suddenly from cardiac arrest is coronary heart disease. Most cardiac arrests that lead to sudden death occur when the electrical impulses in the diseased heart become rapid (ventricular tachycardia) or chaotic (ventricular fibrillation) or both. This irregular heart rhythm (arrhythmia) causes the heart to suddenly stop beating ([www. Americanheart.org](http://www.Americanheart.org)). The term “time is muscle” is used often with medical cardiopulmonary resuscitation (CPR) training. When a victim suffers from cardiac arrest the heart stops contracting, therefore oxygen and blood cannot flow through the body. Eventually the victim will quit breathing and sudden cardiac death will occur if medical intervention does not take place. If oxygen is not restored in the body the heart muscle will die due to lack of oxygen. Every passing minute decreases the rate of survival for victims suffering from cardiac arrest. It is important for professional medical personal to continue up to date training through the American Heart Association. It is equally important to educate the community on proper CPR technique. The more people that are competent in CPR the more lives will be saved.

Cardiac Arrest

Signs and Symptoms of Cardiac Arrest

Cardiac arrest strikes immediately and without warning. The victim will suffer sudden loss of consciousness, without normal breathing, no pulse, and no blood pressure. If the collapse is witness by a bystander, the bystander should call 911 immediately and activate the emergency response system if available. Other symptoms of cardiac problems include the following, and the person should seek medical care immediately.

- Sudden numbness or weakness of the face, arm or leg, especially on one side of the body
- Sudden confusion, trouble speaking or understanding
- Sudden trouble seeing in one or both eyes
- Sudden trouble walking, dizziness, loss of balance or coordination
- Sudden, severe headache with no known cause

The above symptoms can lead to cardiac arrest if not treated by medical persons in a timely manner.

Reasons for Arrest. There are many reasons for cardiac arrest including preventable cause, and some non-preventable causes. Non- preventable reasons for disease are caused without the patient's control such as family history of CAD, hypertension, dyslipidemia and lack of lipoprotein A. Preventable causes are factors that a patient has control over such as sedative lifestyle, obesity, smoking, eating habits, and diabetes type two. One of the largest factors related in cardiac arrest are victims that smoke. Smoking allows nicotine into the body. Nicotine acts as a vasoconstrictor, which results in high blood pressure. High blood pressure can lead to cardiac arrest.

Stages of Arrest. There are three related stages to cardiac arrest. These stages are important for the medical professional to become aware of while treating someone that has suffered arrest.

There is a pre arrest, intra arrest, and post arrest stage. The pre arrest stage can involve patients that have begun the cardiac arrest. In this stage initial CPR success is most important. As noted above cardiopulmonary resuscitation is the number one factor in improving survival of arrest. The intra arrest stage is after the arrest has occurred and the patient is hospitalized. Factors that play an important role in recovery from this stage include the duration of the resuscitative attempt. The longer the duration of the even the worse prognosis is for survival. Another key element to intra arrest is the initial rhythm present during arrest. If the patient was known to suffer ventricular fibrillation or tachy arrhythmia they have better outcomes than those who had suffer pulse less electrical activity. Lastly the largest piece to the intra arrest stage is the victim's physiological variables such as system pH, present rhythm, and arteries blood gas stability. The last stage of arrest is the post arrest stage. This stage is dependent on the patient's recovery. Many medical professionals use the Glasgow coma scale and brainstem reflex test which are highly predictive to positive patient outcomes and recovery.

Cardiopulmonary Resuscitation

Effective CPR

Rapid treatment of cardiac arrest depends on the community, and the emergency cardiac care system. CPR is futile to the recovery of such a deathly arrhythmia. The key ingredients for successful resuscitation are artificial respiration and circulation which keeps the body alive until defibrillation can restart the heart (Podrid, Arnsdorf, Cheng, 12).

Chain of Survival. A concept developed by the American Heart Association called chain of survival is a four-step process of providing treatment to victims of sudden cardiac arrest. A strong chain of survival can improve chances of survival and recovery for victims of heart attack,

stroke and other emergencies. It includes the components or "links" that must be in place to increase a patient's chance of survival of sudden cardiac arrest. The Chain of Survival is the first link in the Chain of Survival is early access to care. This involves recognizing the symptoms of sudden cardiac arrest, and calling 911 or another emergency number to dispatch emergency medical services (EMS) personnel to the scene. The second link is early CPR. An individual trained in CPR administers ventilation and compressions to the victim until a defibrillator or emergency response crews arrive at the scene. These skills allow oxygen-rich blood to be circulated to the victim's brain. The third link is early defibrillation. Early defibrillation means having a properly working defibrillator immediately available at the site of an emergency and having a trained lay rescuer deliver an electric shock and/or all emergency responding units (fire, police, paramedics, etc) able to defibrillate when they arrive at the scene. The fourth link is early advanced care. Early advanced care means the ability to quickly treat a victim of sudden cardiac death with medications and advanced oxygen therapies (www.americanheart.org).

Survival

Survival rates associated with in hospital versus out of hospital cardiac arrest remain stagnant in spite of recent advances in technology (Leeper, 2). Many factors to survival of arrest are the same such as a witnessed or non witnessed event, and the time it takes to start CPR and defibrillation. Other factors include underlying heart rhythm, and if emergent cardiovascular drugs were used are also very important with survival of arrest.

In hospital arrest

A person might believe that falling victim to cardiac arrest while in the hospital would improve chances for survival. The harsh truth is that there is no change in survival rates between

hospital and non-hospital victims. The true indicating factor of survival is witness or non-witnessed arrest. A variety of reasons have been proposed that may contribute to poor outcomes associated with in-hospital cardiac arrest. Some have suggested that there are issues with availability of training personnel, recognition of early warning signs, access to defibrillation equipment, and time of day (Leeper, 4). One of the largest issues contributing to poor outcomes may be the lack of recognition of events leading up to the cardiac arrest that serve as early warning signs (Leeper, 7). Due to the fact that the majority of cardiac death while in the hospital results from untrained personnel, the American Heart Association, and accrediting hospital organizations revised practice guidelines. All licensed medical staff must renew CPR certification every two years instead of every three, and unlicensed staff is educated on the importance of activating the emergency response system.

Out of hospital arrest. The largest factor of survival relating to cardiac arrest out of the hospital setting is if it is witnessed or non-witnessed event. Witnessed events have an increased chance of survival because activation of the emergency response system is immediate, as well as CPR and defibrillation. Non witnessed events are more challenging because it is unknown how long the victim has suffered the arrest. As stated earlier, time is essential to survival. Every minute that passes by is a minute the heart is deprived of oxygen.

It is important to remember that time is of the essence for survival of cardiac arrest. Continuing training and re-training for medical professionals, as well as educating the community on proper CPR will help increase arrest survival rates. An individual can also do their part by following an active lifestyle, and heart healthy diet. Decreasing predisposing factors and increasing education on arrest will improve the overall outcome of this deadly medical condition.

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