

The heart is complicated, hard-working organ (Heart Attack, 2003), that is the only kind of muscle that can contract regularly without tiring; while other muscles require periods of rest (Ray Chu-Jeng Chui, 2001). There are several types of cardiac dysfunction, but heart attacks and the condition called angina are not diseases of the heart itself (Heart Attack, 2003). A heart attack, or cardiac arrest, is the abrupt cessation of normal circulation of the blood due to failure of the heart to contract. It is a medical emergency that, in certain cases patients, is potentially reversible if treated early enough. When unexpected cardiac arrest leads to death, it is called sudden cardiac arrest, often referred to as SCD (Cardiac Arrest, 2007).

Another heart complication is cardiomyopathy congestive. The cause is usually unknown, although alcohol, metal poisoning, and some hormonal conditions can cause it. Symptoms are heart failure, problems with heart block (slow heartbeat), and possibly palpitations. Valves may also become leaky. Some treatments are drugs and sometimes a pacemaker is necessary (Heart Attack, 2003). Another form of cardiomyopathy is hypertrophic. The cause is unknown, but it may run in families. The symptoms are angina, and occasionally fainting attacks due to obstruction of the left ventricle. Drugs may relieve the obstruction; sometimes an operation may be necessary (Heart Attack, 2003).

Coronary artery disease is the most common disease of the heart. It is the result of blocking the coronary arteries with atheroma (fatty deposits). The symptoms of this heart disease are Angina Pain, and it can cause a heart attack and heart failure. Treatment is with drugs or by surgery to improve the heart's blood supply and end the pain. Diuretics remove excess fluid from lungs and tissues (Heart Attack, 2003).

Endocarditis, another dysfunction of the heart, is due to a pre-existing heart problem, usually an abnormal valve, and the infected valve may burst. The symptoms are fever, heart failure, and general ill health. Most treatments are antibiotics, and badly damaged valves may need surgery (Heart Attack, 2003).

Heart block (very slow heart beat) is a degenerative disease of the heart; may be complication of a heart attack. Symptoms are dizziness and fainting, due to the lack of oxygen to the brain. The standard treatment for heart block is a pacemaker (Heart Attack, 2003). Heart failure is the result from almost any form of heart disease. Breathlessness on exertion due to fluid in the lungs, and swelling of the ankles are symptoms. Treatments are diuretics or possibly surgery, in the case of valve disease (Heart Attack, 2003).

Palpitations are the anxiety and over activity of the thyroid gland, and abnormalities in structure; post-heart attack. Symptoms are sensation of rapid heartbeat, dizziness or fainting if too little blood reaches brain. Drugs are used to suppress the abnormal heart rhythm (Heart Attack, 2003).

Valve disease is caused by rheumatic fever; and may be congenital (present from birth). Symptoms are heart failure, aortic valve problems often cause angina because the heart wall thickens, fainting can occur with aortic stenosis (blocked outlet valve) where there is insufficient blood in the circulation. Mitral (inlet) valve problems usually cause palpitations. Treatment is surgical in cases where the symptoms are sufficiently bad. Otherwise, drugs are used to control the symptoms. An operation is necessary for marked aortic stenosis (Heart Attack, 2003).

The cause of cardiac arrest is by problems in the coronary arteries, which supply blood to the heart muscle. When blood supply is interrupted, the heart cannot work properly (Heart Attack, 2003). In a heart attack, or coronary thrombosis, a clot in the artery cuts off the blood supply to part of the heart muscle and this area of muscle dies (Heart Attack, 2003). If too much heart muscle is damaged, the heart stops working (Heart Attack, 2003). Sometimes, when a person's normal heartbeat is disturbed, the heart contractions stop, the patient will lose consciousness, and no pulse will be felt, and breathing will stop (Heart Attack, 2003).

Arrested blood circulation prevents the delivery of oxygen to all parts of the body. Lack of oxygen to the brain causes them to lose consciousness and stop normal breathing (Cardiac arrest, 2007). Brain injury is likely if cardiac arrest is untreated for more than 5 minutes (Cardiac arrest, 2007). New treatments such as induced hypothermia have begun to extend this time. The most important treatable cause of cardiac arrest is ventricular fibrillation (Cardiac arrest, 2007).

Heart problems are among the most common causes of death in the western world (Heart Attack, 2003). There are many types of treatment for cardiac disease and many more preventions and treatments for cardiac arrest. One of the many types of preventions for a fatality from cardiac arrest is defibrillation.

Defibrillation works by giving a therapeutic dose of electrical current to the heart (Cardiac arrest, 2007). Defibrillation can be used externally or internally with an implanted device called an implantable cardioverter-defibrillator, or ICD (Cardiac arrest, 2007). The internal defibrillators are generally used in more life threatening cases since an internal defibrillator may damage some organs much more severely than an external defibrillator. To this

day defibrillators are the only definitive treatment to ventricular fibrillation (Cardiac arrest, 2007).

CPR or cardiopulmonary resuscitation is another type of prevention for a fatality from cardiac arrest. Cardiopulmonary resuscitation works by restarting circulation of blood and air (Heart Attack, 2003). The sternum is compressed intermittently about 60 times a minute while the lungs are expanded with oxygen (Cardiovascular disease, 2007). CPR was invented by an Austrian physician of Czech decent; his name was Peter Safar (Peter Safar, 2004).

Peter Safar was born in Vienna, Austria on April 23, 1924 (Peter Safar, 2007), (Safar, Peter, 2004). His parents were both doctors; his father was a surgeon and his mother was a pediatrician (Safar, Peter, 2004). After finishing his degree in oncology and surgery, Dr. Safar travelled around the world (Safar, Peter, 2004). In Baltimore, Safar conducted research on existing basic life support procedures including controlling a person's breathing airway by tilting back his or her head with an open mouth; and using mouth-to-mouth breathing (Safar, Peter, 2004). He combined these two maneuvers with a procedure known as closed-chest cardiac massage to become the basic life support method of CPR (Safar, Peter, 2004). He worked hard to popularize the procedure around the world and collaborated with a Norwegian company to create "Resusci Anne," the first CPR training mannequin (Safar, Peter, 2004). To further establish that his method worked, in 1957 he wrote a book called the ABC of CPR (Peter Safar, 2007). In 1958, Safar established the first intensive care unit (Peter Safar, 2007). In his later years, Safar won 3 Nobel prizes in medicine (Safar, Peter, 2004), (Peter Safar, 2007). Peter Safar died on August 2, 2003 yet his invention lives on (Peter Safar, 2007). Even today, CPR is the primary first aid treatment for cardiac arrest and is done to provide circulatory support until availability of medical treatment (Heart Attack, 2003). If CPR is not carried out within a few minutes, the

heart and brain will be damaged beyond repair (Heart Attack, 2003). With an adequate airway or when mouth-to-mouth breathing is used, closed cardiac massage is so effective that many men are trained in its use for emergency support of circulation (Cardiovascular disease, 2007).

Robert Jarvik is the inventor of the artificial heart (Robert Jarvik, 2007). To this day, the artificial heart is a major treatment for cardiac cases (Robert Jarvik, 2007). Jarvik's first prototype of the artificial heart was named after himself; it was named Jarvik-7 (Robert Jarvik, 2007). His first company, Symbion Inc, was lost to an opposing company in a hostile take over (Robert Jarvik, 2007). Several years later, Dr. Jarvik founded Jarvik Heart Inc. and began to create a lifetime ventricular assist device called the Jarvik-2000.

A Canadian pioneered the first surgical technique of cardiomyoplasty for failing hearts (Ray Chu-Jeng Chiu, 2001). His name was Ray Chu-Jeng Chiu. Ray was born March 13, 1934 in Tokyo Japan (Ray Chu-Jeng Chiu, 2001). He was educated in Taiwan and Montreal (Ray Chu-Jeng Chiu, 2001). Instead of removing some of a heart patient's back muscle, attach it to the ribs, and wrap it around the heart, Ray designed a special pacemaker contracts the back muscle in time with the heart's own contractions, thus helping a weak heart to function (Ray Chu-Jeng Chiu, 2001). Chu was the first doctor to overcome physiological obstacles for using other types of muscles to assist the heart's function. Chiu subjected the back muscle with four to six weeks of constant low frequency electrical stimulation, and then it resembled a heart muscle (Ray Chu-Jeng Chiu, 2001). The process was actually discovered by biochemists in the 1960's but was not applied to heart surgery until Chiu and researchers began to work on the problem (Ray Chu-Jeng Chiu, 2001).

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