HEAVEN CAN WAIT

EMERGENCY FIRST AID TRAINING

First Aid & CPR Manual Third Edition

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Chapter 8
Heart Attack & Stroke

Cardiovascular Emergencies

Cardiovascular Disease-101

Cardiovascular Disease/Heart Disease are catchall phrases used to describe diseases and injuries to the Cardiovascular System, which includes the heart, blood, and blood vessels. Cardiovascular Diseases include Heart Attack, Heart Failure, Coronary Heart Disease, High Blood Pressure and Strokes.

- Cardiovascular Disease is the number 1 killer of both men and women in the world.
- A person dies every seven minutes from heart disease or stroke in Canada.
- Cardiovascular Disease is responsible for more deaths in Canada than any other disease.
- There are an estimated 70,000 heart attacks per year in Canada. (Statistics provided by the Heart and Stroke Foundation of Canada)

Risk Factors for Cardiovascular Disease

Modifiable	**Non-modifiable**
Stress	Gender
Smoking	Age
Alcohol/drug consumption	Genetics
High blood pressure	Medical history (e.g. Diabetes)
Diet	Race
Exercise	
Cholesterol	

Now Let's Take a Closer Look at How Cardiovascular Disease/Heart Disease Affects Our Blood Vessels

Our blood vessels, which are located throughout our body, carry vital oxygen and nutrients to support our tissues and cells. There are two types of blood vessels; arteries, and veins. **Arteries** carry oxygenated blood (blood containing oxygen) and nutrients away from the heart, to the body's cells and tissues, and are strong, thick elastic blood vessels. **Veins**, which are thinner, less flexible, and which contain one way valves to prevent a backflow of blood, carry deoxygenated blood, carbon dioxide, and waste products from cellular metabolism back to the heart, lungs and liver for their removal. Over time, pressure builds up in our arteries, making them thicker and less elastic. This can lead to a decrease in blood flow to organs and tissues and is known as **Arteriosclerosis**. The more common term used to describe damage to the heart and blood vessels is **Atherosclerosis**. Atherosclerosis is a chronic inflammatory reaction occurring in response to a build up of plaque or fatty deposits in the walls of the arteries. Some of the major culprits leading to atherosclerosis and eventual heart disease are:

- Poor diets, including saturated and trans fats.
- Smoking
- Inactivity
- Being overweight

First Aid Measures that are Priority for all Cardiovascular Emergencies

In general, there are **three** main First Aid measures which are priority for all Cardiovascular Emergencies. They are:

1. Seek medical help immediately ("Time is muscle").

- Myocardial infarction can lead to Sudden Cardiac Arrest.

2. Place the casualty at rest

- Decrease the workload of the heart, thereby decreasing the supply and demand.

3. Provide CPR if necessary.

- CPR at a ratio of 30 Compressions to 2 Ventilations.

Why it is Important to Get Help Immediately

An individual who is unconscious, not breathing, who does not have the presence of a pulse or signs of circulation is deemed "clinically dead" or "vital signs absent" (VSA). Organs in the body, including the brain and heart, possess oxygen and nutrient reserves to keep the tissues alive for several minutes; however, this oxygen is finite. "Clinical death", zero to four minutes post-SCA, is a **reversible phase** if immediate CPR and defibrillation are rapidly initiated. In the absence of appropriate resuscitation techniques (both CPR and defibrillation) brain cells begin to die, generally between four to six minutes post SCA, and the casualty will spiral down a slippery slope incurring irreversible brain damage or "biological death", due to prolonged oxygen deprivation to the brain. Typical onset of biological death is between eight to 10 minutes post SCA. Biological death is an **irreversible phase**.

Some Important Definitions

Clinical Death: Breathing and heart beat cease

• **0-4** minutes after SCA

• This is a **reversible** phase if immediate CPR is initiated and a Defibrillator is applied to the casualty in less than 5 minutes.

- For a casualty in Sudden Cardiac Arrest (SCA), with every minute that passes, his/her chance of survival decreases by 10%.
- There is a 3%-5% chance of survival for an individual suffering an out-of-hospital SCA.
- If immediate and effective CPR is initiated for a SCA casualty and a Defibrillator is attached in less than 5 minutes, there is upwards of 76% chance of survival.

Biological Death: Irreversible brain damage due to prolonged oxygen deprivation to the brain. This typically occurs **8-10** minutes post SCA, if the casualty goes without supplemental oxygen.

- This is an **irreversible** phase.
- Without proper CPR the cells in the brain (neurons) will begin to die within **4-6 minutes.**

Types of Cardiovascular Disorders Explained

Hypertension /High Blood Pressure (HBP): This can be defined as a consistent elevation of systolic or diastolic blood pressure over three different occasions from a person who has been at rest for at least 5 minutes. What does this really mean? Well, the force at which blood must be pumped by the heart through the arteries to eventually reach the rest of the body is increased. This increase causes a hardening, thickening and eventual inelasticity of the blood vessels→ Arteriosclerosis.

- The World Health Organization estimates that HBP causes one in every eight deaths worldwide.
- African Americans are at increased risk for HBP.
- Risk increases with age.

Coronary Artery Disease (CAD): These are diseases which directly affect the arteries that feed the heart muscle, known as the **coronary arteries**. CAD is the leading cause of heart attacks. In general, the blood flow travelling through these arteries becomes restricted as a result of atherosclerosis. The heart muscle does not receive appropriate amounts of blood and therefore, lacks adequate amounts of oxygen.

The Causes of Angina/ Heart Attack (Myocardial Infarction)

Angina: Angina, otherwise known as **Angina Pectoris**, is a severe pain, originating from the heart, in response to a decrease in the amount of blood and therefore, oxygen it is receiving in response to an increased oxygen demand. For economic buffs, angina is a "supply and demand" issue. Here is how it would work. You want to walk up a flight of stairs carrying your laundry. The heart (heart muscle cells) is demanding more oxygen but the supply (in the form of oxygen rich blood), can't reach its customers in time. The heart gets angry and irritable, hence the pain.

Angina is typically caused by atherosclerosis, but there are other factors which can contribute to the phenomenon, such as exposure to cold, participation in sports, climbing stairs, and shoveling snow.

Rest and medication generally cause a cessation in pain and symptoms associated with angina. If symptoms persist longer than 10 minutes **after** rest and treatment with medication, then something more serious may be occurring→ **Myocardial Infarction**.

Heart Attack (Myocardial Infarction): A **Heart Attack**, otherwise referred to as a **Myocardial Infarction (MI)** is the death of heart muscle cells in response to prolonged oxygen deprivation. Any phenomenon that completely interrupts the flow of blood through the coronary arteries will cause a heart attack. Culprits such as blood clots and fatty deposits lining the artery walls are common causes. When the heart muscle becomes completely deprived of blood and oxygen, the heart begins to fail and therefore, blood is not adequately circulated to the rest of the body. An oxygen-deprived heart muscle becomes susceptible to life-threatening electrical conduction disturbances called **arrhythmias**; the most common being **Ventricular Fibrillation**. Heart attacks are very serious and potentially life-threatening conditions which can ultimately lead to Cardiac Arrest.

- Heart cells begin to die after approximately 20 minutes of oxygen deprivation.
- There is a medication, called a thrombolytic, which can be administered to an individual suffering from a MI, in a hospital setting. This medication can potentially reverse the effects and re-establish blood flow through the coronary arteries. Call 9-1-1 immediately for EMS transport to hospital as soon as possible.

Heart Failure: Heart failure, also known as **Congestive Heart Failure**, is a condition in which the heart is unable to pump adequate amounts of blood to the organs and tissues. This condition can cause shortness of breath, swelling of ankles (fluid retention) and generalized fatigue.

Stroke/Cerebral Vascular Accident (CVA): The two classifications of strokes are Ischemic (Decreased blood flow as a result of a physical blockage in one of the brain's blood vessels) and Hemorrhagic (Hemorrhaging/bleeding from a ruptured blood vessel in the brain). A Stroke/CVA, is sometimes referred to as a **"brain attack"** and is a brain injury resulting from a disruption of blood flow through the brain. Regardless of the type of stroke (ischemic or hemorrhagic), reduction in blood flow and oxygen can lead to brain injury and death of brain cells causing permanent damage and disability. Individuals who are especially at risk are elderly who have high blood pressure, diabetics, individuals with high cholesterol and individuals who have heart disease.

Signs and Symptoms of Angina and Myocardial Infarction

- Denial
- Pain ranging from a mild discomfort to crushing chest pain, fullness, pressure, ache, or constriction. Also described as a squeezing, tightness, or a heavy feeling/pressure in the chest.
- Pain is often felt in the centre of the chest behind the breast bone (sternum).
- Pain may spread to the shoulder, neck, jaw or arm.(Common in left arm but may also be felt in right arm)
- Upper Back Pain
- Toothache
- Anxiety
- Shortness of breath
- Cool, pale skin
- Nausea/vomiting
- Indigestion/Heart Burn
- Palpitations
- Weakness and fatigue
- **Angina is often classified as pain lasting less than 10 minutes, brought on by physical activity, not as intense and relieved by medication and rest.**
- Post menopausal women and female diabetics are at greater risk of suffering from a heart attack.
- The most common symptom of a heart attack in women is **chest pain.**
- Heart disease is the leading cause of death in women.
- 1/3 of women experience **no** chest pain when experiencing a heart attack and another 71% describe feeling flu-like symptoms anywhere from 2 weeks to a month prior to having more serious and common signs and symptoms. Other sings and symptoms females may experience are nausea/vomiting that won't stop, discomfort in the lower jaw, discomfort in the upper back, sudden onset of weakness that won't go away, physical inability