

Cardiovascular Disease and Exercise

By Jeremy Workman

Cardiovascular disease (CVD) is the major cause of death and serious illness today. CVD is actually a general term that describes several different illnesses. These include coronary artery disease, hypertension, stroke, congestive heart failure, arteriosclerosis, congenital heart disease, and others. Three of the most prevalent are the focus of this article: coronary artery disease, stroke, and hypertension.

Definition of Conditions

Coronary artery disease (CAD) results from a lack of blood to the heart, which leads to atherosclerosis of the coronary artery. As humans age, the coronary arteries that supply the heart with blood become gradually narrower due to build up of fatty plaque. As a result, blood supply to the heart is reduced. Eventually, the heart cannot get enough blood to meet its demands and it can become ischemic or blood-deficient. Ischemia of the heart can cause chest pain during exercise or physical exertion. Eventually, blood supply can diminish to the point of heart attack, which can lead to disability or even death. CAD can begin as early as the teenage years, progressing steadily as the individual ages. The rate of progression can be slowed by changing various lifestyle factors, such as diet and exercise.

Stroke is a type of cardiovascular disease that affects the cerebral arteries in the brain. Blockage can occur in one or more of these arteries, which can cause brain tissue to die. Stroke can also disrupt sensory perception and cause paralysis to one or more limbs. Strokes can happen a couple different ways. A blood clot can form in the cerebral vessel, which is known as cerebral thrombosis. A mass of material can form in another part of the body and travels to the cerebral artery and lodge itself there, forming a cerebral embolism. In both cases, blood flow is restricted past the blockage. A brain hemorrhage is also a cause of stroke. The vessels of the brain can rupture and blood flow is diminished past the point of the rupture.

Hypertension is chronically elevated blood pressure that is above what is considered healthy for individuals. There are two numbers when giving a blood pressure. The top number, which is systolic, is the pressure exerted by blood on the blood vessel walls throughout ventricular contractions. The bottom number, which is diastolic, is the pressure of the lowest point of any ventricular cycle. A normal blood pressure is expressed as 120/80. That is a systolic pressure of 120 and diastolic pressure of 80. When the pressure is 140 or more for systolic and 90 or more for diastolic, this is hypertension. Hypertension causes the heart to work harder than ordinary because it has to pump harder against a greater resistance. There is also more of a strain on the arteries causing them to become damaged over time. Hypertension can lead to other problem such as heart attacks and heart failure down the road.

Warning Signs & Risk Factors

With CAD, the major warning signs are ischemia, which is when an individual has chest pain during increased physical exertion. As mentioned before, this can progress to a heart attack. This is the biggest warning sign that someone has it but you do not want CAD to progress that far. What is important is to have an early diagnosis of CAD and begin treatment before having ischemia or a heart attack. There are controllable risk factors that are widely used to determine if someone is at greater risk of having CAD. These risk factors are current cigarette smoker, hypertension, elevated blood cholesterol, sedentary lifestyle, diabetes, and obesity. When one or more of these risk factors are present, an individual has increased chance of having CAD and should seek medical help.

For stroke, it is imperative for an individual to identify warning signs not only for themselves but also for care for someone else who might be having one. Signs for a stroke are numbness and weakness of the face, arms, and legs, usually on one side of the body; confusion or trouble speaking; may have trouble seeing; may have trouble walking, plus dizziness and loss of balance; may experience a severe headache with known cause. If a person is experiencing these symptoms, it is imperative that someone acts quickly to get them to medical help. Time is everything. There are controllable risk factors to help a person reduce their chance of getting a stroke. These risk factors are tobacco use, hypertension, elevated blood cholesterol, sedentary lifestyle, diabetes, and obesity. When one or more of these factors are present, an individual has increased chance getting a stroke and should seek medical help. A doctor can prescribe drugs for people who are at risk for stroke in order to reduce their chance of getting an incident.

Hypertension has no symptoms. In fact, some people go years without even knowing that they have it. The reason why it is important to treat hypertension is that you can reduce your chance of stroke by 35-40% and heart attack by 20-25%. The controllable risk factors for hypertension are obesity, eating too much salt, excessive alcohol intake, sedentary lifestyle, and stress. Again, if someone has one or more of these risk factors, they have increased chance and should see medical help. The best way to measure blood pressure is a standard blood pressure cuff called a sphygmomanometer, which your physician can perform in the office

Treatments

The treatments for CAD are after someone has gone in to the doctors and certain test(s) are performed which determine if the heart is not getting enough blood and oxygen. These tests determine if CAD is present and to what extent. The first treatment is for pain associated with angina. Certain medicines such as nitroglycerine, beta-blockers, and calcium channel blockers are given for pain. However, medicines cannot reduce plaque build-up. The only way to get rid of plaque is medical procedures. There are two main types. One is transcatheter interventions and is considered non-surgical. Two common types are angioplasty and atherectomy. The other intervention is surgical procedures where the most common is coronary artery bypass surgery. The use of surgical or non-surgical depends on the degree of plaque build-up, the location of the blockage, how much heart muscle is at risk, and the health status of the patient.

The treatment for stroke can be an emergency procedure. The faster an individual can get to treatment, the more effective it can be because it can help restore blood and oxygen to the part of the brain where it was affected. Medication is used to dissolve blood clots, reduce brain swelling, and protect brain from lack of oxygen. Life support machines can support bodily functions such as respiration, blood pressure control, and nutritional providence. For non-

emergency stroke treatment, other medications can help prevent future strokes. A common type of medicine is an anticoagulant, which help prevent blood clotting. Other medicines that can control risk factors such as diabetes and hypertension can be used as well to help prevent another incident. Surgery can be used to treat stroke or help to prevent it as well. Surgeries can remove clots or plaque from the carotid arteries, remove blood clots or repair bleeding in the brain, and repair aneurysms, which are, weakened areas on an artery wall that can cause a stroke.

Hypertension can be treated through lifestyle changes. These changes might include an individual losing weight if they are overweight, be more physically active, reduce alcohol intake, relax more, and have better eating habits, which can be reduced sodium, saturated fat, and cholesterol intake. Medication can also be used in treating hypertension. The doctor will determine which treatment is best. Treating hypertension may require lots of time. It takes time to find the right medicine for individual concerns such as side affects. In addition, lifestyle changes that affect blood pressure can take time to adjust to especially if an individual has been accustomed to not so favorable conditions their whole life. An example is diet. When people start eating better because of medical reasons, they are not use to the different flavors and textures of food that they are eating now. They might go back to old habit quite frequently, especially from the start. This will affect their treatment plan in a negative way. It might take a while for an individual incorporate healthy eating in their lifestyle.

You may have noticed that in every one of the risk factors, physical inactivity is a positive correlation for increased risk of each of these conditions. Increased physical activity can be a long-term preventative solution to each of these diseases to help prevent or the reoccurrence for these conditions. The best advice is to be active. Being active can mean doing 30 minutes or more of activity 5 or days a week. That activity could be washing your car, working out in the garden, running, walking, basketball, bowling, racquetball, biking, and many, many more. In today's society, machines have made it easier and made us less active in order to live our everyday lives. We have to put activity in our everyday life in order to live healthy. One great way to increase activity is to get on a designed exercise routine that includes weight training, cardiovascular exercise, and stretching. Through this, risk of these conditions is decreased and other benefits are obtained as well. With a doctor's approval, exercise can help prevent these cardiovascular conditions.

Exercise Prescription

Exercise can have excellent benefits after treatment of these conditions. CAD and hypertension fall under the same guidelines for exercise guidelines. For CAD and hypertension, exercise guidelines are part of an overall health modification called cardiac rehabilitation programs. These programs are for prevention or treatment for CAD and hypertension. This program addresses risk factors for CAD and hypertension such as high fat diets, obesity, inactive lifestyle, and current smoking. This program looks to educate and improve each of these areas systematically. What happens is when an individual has CAD or hypertension, they might think they have to change completely their way of living and this could be a mental stress and they might not be able to do it. What cardiac rehab programs allow is small, but effective changes that are easier for people to do. The exercise portion of the program has 3-4 stages. The first stage only implies to people who are inpatient and have a heart attack or surgery. The exercise is low level walking, intermittent sitting or standing, and daily activity exercises. Education on risk factors, medication, and limitations are discussed with the patient and the family. The second phase (4-12 weeks) is an outpatient cardiac rehabilitation program involving an ECG. The exercise involved is usually on a treadmill or exercise bike. This helps to get the patient moving again and provides information on developing an exercise routine for the future. The third phase (3-6 months) involves increased exercise sessions, which can be 50-60 minutes in duration up to

three times a week. The patient receives counseling on exercise on risk factor modification and is encouraged to increase physical activity in daily living. The fourth phase consists of exercise the patient will do for the rest of their life. This phase consists of less supervision and strength training exercises are incorporated. Other activities are stairclimber, rowing machine, pool activities, and aerobic dance.

Exercise for stroke patients has been shown to help make quality of life better in a variety of ways. Here are some reasons why a stroke patient should exercise. One is increased activity. The patient is inactive after stroke because of activity intolerance. Problem could arise from this inactivity such as osteoporosis, muscle atrophy, greater dependency on others for activities for daily living (ADL). Another reason is to increase daily function and make ADL easier since stroke is a leading cause of long-term disability in the U.S. today. Examples of these are walking, bathing, getting dressed, walking up stairs. One reason that is more important is decrease chance of another stroke and/or decrease chance of some other type of cardiovascular disease. An exercise routine can consist of aerobic exercise, strength training, and stretching. Aerobic exercise should be done 3-7 days a week, 20-60 minutes in duration, and using 50-80% of maximal heart rate. Aerobic exercise can be upper or lower body but the ideal mode to use is the treadmill. By using the treadmill, the patient can improve their walking which can be impaired from the stroke, the patient can hold on to the rails, and can increase to elevation. Strength training should be done 2-3 times per week, using 1-3 sets of 10-15 repetitions involving major muscle groups. Stretching exercises are done 2-3 days a week before the strength training is done. Leisure time activities are much recommended for stroke patients for a variety of reasons. Reasons are they are learning to deal with social situations, it may help with depression, and they get the benefits of physical activity. Leisure time activities include going on a walk, exercises classes, and swimming.