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FACTS ABOUT CORONARY ARTERY DISEASE (CAD)

Some seven million Americans suffer from coronary artery disease (CAD), the most common form of heart disease. This type of heart disease is caused by a narrowing of the coronary arteries that feed the heart.

CAD is the number one killer of both men and women in the U.S. Each year, more than 500,000 Americans die of heart attacks caused by CAD.

Many of these deaths could be prevented because CAD is related to certain aspects of lifestyle. Risk factors for CAD include high blood pressure, high blood cholesterol, smoking, obesity, and physical inactivity - all of which can be controlled. Although medical treatments for heart disease have come a long way, controlling risk factors remains the key to preventing illness and death from CAD.

Who is at risk for CAD?

Risk factors are conditions that increase your risk of developing heart disease. Some can be changed and some cannot. Although these factors each increase the risk of CAD, they do not describe all the causes of coronary artery disease; even with none of these risk factors, you might still develop CAD.

Controllable:

- High blood pressure
- High blood cholesterol and triglycerides
- Smoking
- Obesity
- Physical inactivity
- Diabetes
- Stress (Although stress may be a risk factor for CAD, scientists still do not know exactly how stress might be involved in heart disease)

Uncontrollable:

- Gender
- Heredity (family history of CAD)
- Age

What is CAD?

Like any muscle, the heart needs a constant supply of oxygen and nutrients that are carried to it by the blood in the coronary arteries. When the coronary arteries become narrowed or clogged and cannot supply enough blood to the heart, the result is CAD. If not enough oxygen-carrying blood reaches the heart, the heart may respond with pain called angina. The pain is usually felt

in the chest or sometimes in the left arm and shoulder. (However, the same inadequate blood supply may cause no symptoms, a condition called silent angina). When the blood supply is cut off completely, the result is a heart attack. The part of the heart that does not receive oxygen begins to die, and some of the heart muscle may be permanently damaged.

What causes CAD?

CAD is caused by a thickening of the inside walls of the coronary arteries. This thickening, called atherosclerosis, narrows the space through which blood can flow, decreasing and sometimes completely cutting off the supply of oxygen and nutrients to the heart.



Atherosclerosis in the Coronary Arteries

Atherosclerosis often occurs when a person has high levels of cholesterol, a fat-like substance, in the blood. Cholesterol and fat, circulating in the blood, build up on the walls of the arteries. The buildup narrows the arteries and can slow or block the flow of blood. When the level of cholesterol in the blood is high, there is a greater chance that it will be deposited onto the artery walls. This process begins in most people during childhood and the teenage years, and worsens as they get older.

In addition to high blood cholesterol, high blood pressure and smoking also contribute to CAD. On the average, each of these doubles your chance of developing heart disease. Therefore, a person who has all three risk factors is eight times more likely to develop heart disease than someone who has none. Obesity and physical inactivity are other factors that can lead to CAD. Overweight increases the likelihood of developing high blood cholesterol and high blood pressure, and physical inactivity increases the risk of heart attack. Regular exercise, good nutrition, and smoking cessation are important in controlling the risk factors for CAD.

What are the symptoms of CAD?

Chest pain (angina) or shortness of breath may be the earliest signs of CAD. A person may feel heaviness, tightness, pain, burning, pressure, or squeezing, usually behind the breastbone but sometimes also in the arms, neck, or jaws or back. These signs usually bring the patient to a doctor for the first time. Nevertheless, some people have heart attacks without ever having any of these symptoms. There is no relationship between the severity of pain to the severity of the disease.

It is important to know that there is a wide range of severity for CAD. Some people have no symptoms at all, some have mild intermittent chest pain, and some have more pronounced and steady pain. Still others have CAD that is severe enough to make normal everyday activities difficult.

Because CAD varies so much from one person to another, the way a doctor diagnoses and treats CAD will also vary a lot. The following descriptions are general guidelines to some tests and treatments that may or may not be used, depending on the individual case.

Are there tests for CAD?

There is no one simple test - some or all of the following procedures may be needed. These diagnostic procedures are used to establish CAD, to determine its extent and severity, and to rule out other possible causes of the symptoms.

After taking a careful medical history and doing a physical examination, the doctor may use some tests to see how advanced the CAD is. The only certain way to diagnose and assess the extent of CAD is coronary angiography (see below); other tests can indicate a problem but do not show exactly where it is.

An examination for CAD may include the following tests:

An electrocardiogram (ECG or EKG) is a graphic record of the electrical activity of the heart as it contracts and rests. Abnormal heartbeats and some areas of damage, inadequate blood flow, and heart enlargement can be detected on the records.

A stress test (also called a treadmill test or exercise ECG) is used to record the heartbeat during exercise. This is done because some heart problems only show up when the heart is working hard. In the test, an ECG is done before, during, and after exercising on a treadmill; breathing rate and blood pressure may be measured as well. An echocardiogram will also be performed on completion of the test. Exercise tests are useful but are not completely reliable; false positives (showing a problem where none exists) and false negatives (showing no problem when something is wrong) are fairly common.

Nuclear scanning is sometimes used to show damaged areas of the heart and expose problems with the heart's pumping action. A small amount of radioactive material is injected into a vein, usually in the arm. A scanning camera records the nuclear material that is taken up by heart muscle (healthy areas) or not taken up (damaged areas).

Coronary angiography (or cardiac catheterization) is a test used to explore the coronary arteries. A fine tube (catheter) is put into an artery of an arm or leg and passed through the tube into the arteries of the heart. The heart and blood vessels are then filmed while the heart pumps. The picture that is seen, called an angiogram or arteriogram, will show problems such as a blockage caused by atherosclerosis.

How is CAD treated?

CAD is treated in a number of ways, depending on the seriousness of the disease. For many people, CAD is managed with lifestyle changes and medications. Others with severe CAD may need surgery. In any case, once CAD develops, it requires lifelong management.

What kind of lifestyle changes can help a person with CAD?

Although great advances have been made in treating CAD, changing one's habits remains the single most effective way to stop the disease from progressing. If you know that you have CAD, changing your diet to one low in fat, especially saturated fat, and cholesterol will help reduce high blood cholesterol, a primary cause of atherosclerosis. In fact, it is even more important to

keep your cholesterol low after a heart attack to help lower your risk of having another one. Eating less fat should also help you lose weight. If you are overweight, losing weight can help lower blood cholesterol and is the most effective lifestyle way to reduce high blood pressure, another risk factor for atherosclerosis and heart disease.

People with CAD can also benefit from exercise. Recent research has shown that even moderate amounts of physical activity are associated with lower death rates from CAD. However, people with severe CAD may have to restrict their exercise somewhat. If you have CAD, check with your doctor to find out what kind of exercise is best for you.

Smoking is one of the major risk factors for CAD. Quitting smoking dramatically lowers the risk of a heart attack and also reduces the risk of a second heart attack in people who have already had one.

What medications are used to treat coronary artery disease?

Medications are prescribed according to the nature of the patient's CAD and other problems. The symptoms of angina can generally be controlled by "beta-blocker" drugs that decrease the workload on the heart, by nitroglycerine and other "nitrates" and by "calcium-channel blockers" that relax the arteries, and by other classes of drugs. The tendency to form clots is reduced by aspirin or by other platelet inhibitory and anticoagulant drugs. Beta-blockers are given to decrease the recurrence of heart attack. For those with elevated blood cholesterol that is unresponsive to dietary and weight loss measures, cholesterol-lowering drugs may be prescribed, such as a statin, lipitor, pravachol or zocor, colestipol, cholestyramine, gemfibrozil, niacin or zetra. Impaired pumping function of the heart may be treated with digitalis drugs or ACE inhibitors. If there is high blood pressure or fluid retention, these conditions are also treated.

Ask your doctor which medication you are taking, what it does, and whether there are any side effects. Knowing more about this will help you stick to the schedule that has been prescribed for you.

Coronary angioplasty and/or stenting (see "Descriptions of PCI") begins with a procedure similar to that described under angiography. However, the catheter positioned in the narrowed coronary artery has a tiny balloon at its tip. The balloon is inflated and deflated to stretch or break open the narrowing and improve the passage for blood flow. The balloon-tipped catheter is then removed. Another catheter with a stent may then be delivered to the site, the balloon inflated and stent "deployed" in the artery and then the balloon withdrawn leaving the stent in place permanently.

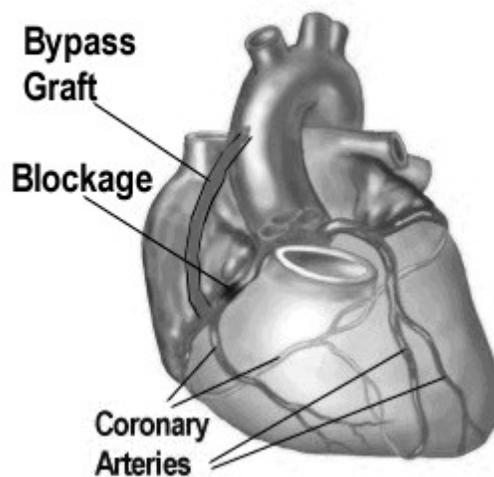


What types of surgery are used to treat CAD?

Many patients can control CAD with lifestyle changes and medication. Surgery may be recommended for patients who continue to have frequent or disabling angina despite the use of medications, or people who are found to have severe blockages in their coronary arteries.

Strictly speaking, angioplasty and/or stenting is not surgery. It is done while the patient is awake and may last one to two hours. If angioplasty does not widen the artery or if complications occur, bypass surgery may be needed.

In a **coronary artery bypass operation**, a blood vessel, usually taken from the leg or chest, is grafted onto the blocked artery, bypassing the blocked area. If more than one artery is blocked, a bypass can be done on each. The blood can then go around the obstruction to supply the heart with enough blood to relieve chest pain.



Bypass surgery relieves symptoms of heart disease but does not cure it. Usually you will need to make a number of changes in your lifestyle after the operation. If your normal lifestyle includes smoking, a high-fat diet, or no exercise, changes are advised.