

**UNDERSTANDING
CORONARY
ANGIOGRAPHY &
ANGIOPLASTY**

Problems with your heart

You may have had symptoms of a heart problem such as chest pain, shortness of breath or palpitations. Or your doctor may have detected signs of heart disease during a physical check up. You may also have some tests already such as stress ECG, heart ultrasound or a nuclear scan.

Your doctor may suggest you a procedure called cardiac catheterization which can help him identify your heart problem more clearly (with an angiography) and in some cases treat it (with an angioplasty).

Numbness, tingling in arms, elbows or wrists may be symptoms of coronary artery disease.

Symptoms of heart problems

The onset of heart disease is often silent.

The preliminary symptoms can be:

- Shortness of breath;
- Angina (pain or pressure on the chest, stomach, arm or jaw);
- Dizziness;
- Palpitations.

Breathing problems when lying down can be a symptom of heart disease.

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How and why are coronary angiography and angioplasty done?

Coronary angiography and angioplasty are common, mostly pain free and non-surgical procedures used for diagnosing a heart disease and in some cases also for treating it. Your cardiologist introduces a small tube (catheter) into a blood vessel and guides it to your heart. Once the catheter is in place, x-rays and other tests help your doctor to evaluate how your heart and your coronary arteries (the arteries surrounding the muscle of heart) work.

These tests can show:

- Whether coronary arteries are blocked;
- Whether your heart is pumping correctly and blood is flowing normally;
- Whether your heart has any birth defect.

If angiography detects blockages in the coronary arteries your doctor may perform angioplasty and restore blood flow to your heart.

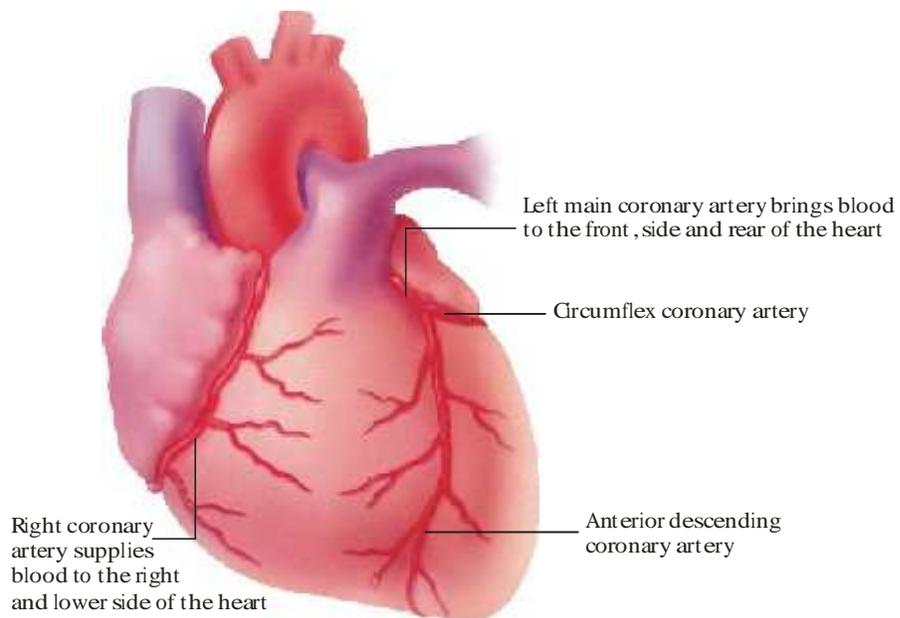
The heart and its arteries

The heart is a muscle which works as a pump to circulate blood throughout your body. Its chambers (2 Ventricles and 2 atria) and valves are responsible for allowing blood to flow in the correct direction and to the required extent.

The heart is a muscle of the size of your own fist located at the centre of your chest.

Coronary arteries bring oxygen to the heart

Coronary arteries are blood vessels which surround your heart and supply it the oxygen-rich blood which it needs. The left coronary artery is made of the main artery which splits into two branches: the circumflex and the anterior descending coronary artery, which bring blood to the front, side and rear of the heart. The right coronary artery supplies blood to the right and lower side of the heart.



Understanding coronary artery disease

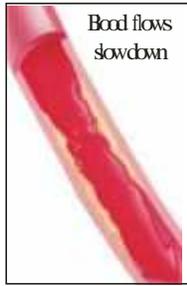
Coronary artery disease is often caused by atherosclerosis: a plaque (fatty material) builds up in the inner wall of the blood vessel, makes it less elastic and reduces oxygen-rich blood flow to the heart muscle. If the plaque increases to the point of obstructing the vessel completely, blood may not be able to reach a part of the heart muscle. That area may not receive all the oxygen and nutrients needed. In such a case heart attack may occur.

Healthy artery

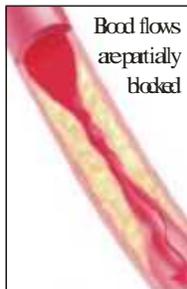


In healthy coronary arteries oxygen-rich blood flows freely and easily reaches the heart muscle.

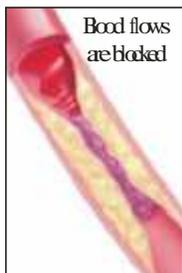
How atherosclerosis progresses



As plaque is formed, blood flow to the heart muscle is reduced. If the obstruction is small, probably there will not be any symptom.



When the artery is narrowed, blood flow to the heart muscle is partially blocked and the patient may experience symptoms of angina.



When the flow of oxygen-rich blood to the heart muscle is completely blocked by plaque or a blood clot, the patient may have a heart attack.

Risk factors of atherosclerosis

Atherosclerosis starts when factors such as smoking, high level of sugar in the blood (diabetes), high blood pressure, high cholesterol, uncontrolled stress, unbalanced diet and sedentary lifestyle damage the inner wall of the arteries and cause cholesterol and other fats to build up as plaque. These factors make atherosclerosis progress over time if they are not controlled.

Detecting heart problems

With cardiac catheterization different tests can be performed to detect problems within the arteries, valves or heart muscle. The doctor may use results of these tests to decide the best treatment for the disease.

Coronary angiography

Coronary angiography is a particular type of x-ray which makes the coronary arteries visible and shows narrowing if any.

Ventriculography is a type of x-ray which highlights the shape and movement of the chambers of heart. These tests also detect problems in the valves or inner walls of the heart.

Other tests

With cardiac catheterization other tests such as the measurement of the amount and pressure of blood pumped by the heart, may also be done. These tests help the doctor in evaluating if the heart muscle and valves are working properly.

Treating heart problems

With cardiac catheterization the doctor can also treat heart problems such as disease of coronary artery. If needed, he can perform angioplasty to reopen a blocked artery and restore blood flow to the heart muscle.

Angioplasty

Angioplasty is a procedure which uses cardiac catheterization to open narrowed arteries by pressing the plaque against the artery wall. With the repeated inflation of a small balloon positioned at the end of a special catheter, the plaque is compressed and blood flow restored. The procedure ends with the removal of the balloon -tipped catheter.

Angioplasty with stent

Most of the times, positioning a stent completes angioplasty. A stent is a cylindrical wire mesh which is placed inside the coronary artery at the point where the plaque has been compressed. It guarantees the compression of the plaque over time and thus helps the artery stay open.

Drug-eluting stents

Yukon Choice PC Sirolimus Eluting Stent which has been implanted has sufficient clinical data for its efficacy and safety.

The pharmacological agent Sirolimus (drug) eluted by the stent limits the growth of smooth muscle cells in the vessel wall being treated by reducing the narrowing of the stented area of the artery (Restenosis) over time.

Angioplasty with stent

If during angiography the doctor detects a partial or total obstruction of a coronary artery, he/she may recommend an angioplasty procedure. Usually, this procedure is adapted right away.

Steps of angioplasty

The procedure of angioplasty continues for one to two hours depending on the complexity of the case. A guide wire is inserted through a introducing sheath and directed to the coronary artery across the site of obstruction.

- 1. A small guide wire is positioned**
A guide wire is inserted and advanced to reach the narrowed/ obstructed point.
- 2. A balloon is positioned**
A balloon-tipped catheter is guided over the wire to reach the blocked area of the artery.
- 3. The balloon is inflated**
The balloon is inflated to compress the fatty deposits and plaque. When the balloon is inflated you may experience angina.

Stent application

After the compression of the plaque against the wall of the vessel with the balloon, a stent is inserted.

4. The catheter with the stent is positioned

A closed mesh stent is placed over an un-inflated balloon catheter and positioned at the point of obstruction.

5. The stent expands

The balloon over which the stent is placed is inflated, making the stent adhere to the walls of the artery. This allows the stent to keep the plaque compressed against walls of the artery.

6. The balloon is deflated

The balloon which has positioned the stent is deflated and removed. The stent keeps the artery open by reducing the risk of another future narrowing. New tissue grows around the stent which eventually become part of the arterial wall.

Removing the catheter

The procedure ends when the doctor removes the catheter and the sheath. The nurse will manually compress the insertion area for about 20 minutes. Today many surgeons use special closure devices which avoid the need for prolonged manual compression and allow you to move 1-2 hours after the procedure and walk after about 6 hours.

After angioplasty

After the procedure the patient is brought back to his/her room. The doctor will tell his/her the results of the procedure and provide indications on medications or other treatments which are needed. He/She may also be scheduled for follow-up appointments. Generally, he/she should be able to leave the hospital after the procedure is completed.

At the hospital

If the catheter is inserted in his/her leg, he/she will be asked to keep it still to prevent bleeding. If femoral artery closure devices have been applied, immobilization may not be necessary and he/she may be able to walk after a few hours.

In any case, before leaving the hospital he/she should be able to walk easily.

Going home

Don't drive home as driving can stress the site of catheter insertion. If femoral artery has been closed with closure device, the doctor may suggest special precautions for the first 3-4 days after procedure such as to avoid staying seated for more than an hour, driving, having a hot bath (you can take a shower instead), and riding a bicycle.

Back to work

Usually the patient should be able to get back to work one or two days after leaving the hospital but each case must be examined separately based on the kind of job and the conditions of the heart.

Follow-up appointments

Tests such as stress ECG or nuclear scan are frequently used to verify the results of angioplasty. Usually, a stress ECG is scheduled a few months after angioplasty.

Stress ECG records heart activity while exercising on a treadmill or stationary bicycle.

When to call a doctor

A doctor must be contacted if one of the following symptoms is experienced:

- Angina (chest pain);
- Swelling, irritation, heart pain, blood loss or pus (yellow-green discharge) at catheter insertion site;
- Fever or shivers;
- Strong pain.

In the event of bleeding at the insertion site, lie down, compress the area and call a doctor right away.

After angioplasty

The doctor may prescribe medications after the procedure. All the instructions so received must be followed closely.

Medications

The doctor may prescribe antiplatelet agents (such as aspirin, ticlopidine, clopidogrel, or prasugrel). These drugs help reduce risk of blood clots and are often taken two at a time (**dual antiplatelet therapy**). The compliance with the medicine is extremely important for long term patency of the stented area of the artery. These medicines also reduce the potential side effects associated with angioplasty. The patient should also remember to insist on the brand and dosage of the medicine prescribed by doctor.

Precautions

Please take advice of the doctor before taking treatment of any other disease. Medicines may need to be altered in case the patients are going for some surgery or diagnostic tests.

Keeping risk factors under control

There are no procedures or drugs which can treat coronary artery diseases permanently. Contribution to slow down the progression of disease and keep the heart healthy as long as possible comes through changes in the lifestyle. The first step is detecting the risk factors (conditions or behaviors which can cause atherosclerosis). Some risk factors cannot be changed but one can work on others to modify them. With healthy lifestyle choices one can sometimes avoid drugs or surgery, especially at the early stages of the disease.

Discover your cardiovascular risk factors

Some risk factors are modifiable while others are not. Unhealthy lifestyles and medical conditions are both modifiable. The more risk factors you have, the higher is your chance of having a stroke or a heart attack in the near future. Use the following chart to identify, with the help of your doctor, your risk factors.

Medical conditions

High blood pressure, diabetes, high cholesterol and obesity are detectable through tests and can be controlled by healthy lifestyles and medications prescribed by the doctor.

Unhealthy lifestyles

A bad diet, a sedentary lifestyle, smoking and uncontrolled stress are risk factors which you can identify on your own and act upon with the advice of your doctor.

Quit smoking

If you smoke, quitting is the best thing you can do to avoid the progression of your disease. Smoking reduces the quantity of oxygen which reaches the heart, increases plaque buildup on artery walls and increases the risk of heart attack. Moreover, always keep in mind that smoking is the main risk factor for cancer (e.g. lung cancer).

A plan to quit

Once you take the decision, ask your doctor for support and then quit at a set date.

Get support

Spend your time with nonsmokers or people who are trying to quit, like yourself. You will have the chance to share positive results and frustrations. Make a list of the reasons for quitting.

Don't give-up

Don't give-up. Quitting smoking demands time and perseverance. Many smokers try four or five times before succeeding. Avoid places where people smoke. Change your routine to avoid triggers (situations that tempt you to light a cigarette). chew sugar free gum or candy.

Exercising

Like any other muscle, the heart takes advantage of regular exercise. Physical activity lowers stress levels, brings down cholesterol and helps weight loss. Before starting an exercise programme ask your doctor if it is suitable for you.

Choose aerobic exercises

Choose aerobic exercises such as cycling, swimming, light jogging and dancing, which increase the heart rate for several minutes and improve the use of oxygen by the heart and lungs.

Exercise regularly

If you haven't been exercising for a while, start with three times a week for 5-10 minutes, then gradually reach 20-40 minutes of exercise four or five times a week.

If you have angina while exercising, stop immediately, take your medications for angina, and tell your doctor.

Healthy eating

Changing eating habits may help reduce many risk factors. Cholesterol and blood pressure levels can decrease, along with body weight. A healthy diet doesn't necessarily have to be tasteless, boring and repetitive. Your entire family will benefit from healthier eating habits. Keep in mind these key words: less fat, less salt and more fiber.

Less fat

- Eat less red meats and more fish and chicken
- Limit butter and margarine, prefer moderate amounts of olive oil
- Eat less high fat dairy products and choose skimmed milk and yoghurt
- Look for cook books with low-fat recipes

Less salt

- Don't add salt when cooking and don't put salt on the table
- Use small amounts of glutamate and sodium
- Replace salt with herbs, garlic, onion and lemon juice for added flavour
- Avoid fast-food

More fiber

- Eat fresh fruits and vegetables
- Whole grain pasta, bread, rice and beans contain high amounts of fiber
- While adding fiber to your diet, remember to drink a lot of water to avoid constipation

REMEMBER: to keep cholesterol, diabetes and high blood pressure under control your doctor may prescribe specific medications. Remember that drugs never act as a substitute for a healthy lifestyle but always work in association with it.

Looking to a healthy future

To keep up the good results of angioplasty it's important to take all prescribed medication regularly and for all the necessary time. Don't go back to your bad habits, but make healthy lifestyle to protect your heart and prevent diseases.

Wish you a healthy heart & hearty life.....

Yukon[®] Choice PC
Sirolimus Eluting Coronary Stent System

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