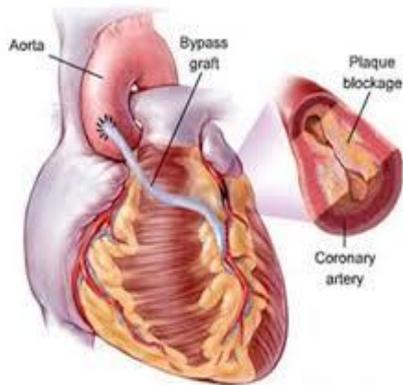


# Coronary Artery Bypass Graft



**C**oronary artery bypass grafting (CABG) is a type of surgery that improves blood flow to the heart. Surgeons use CABG to treat people who have severe coronary heart disease (CHD).

CHD is a disease in which a waxy substance called plaque (plak) builds up inside the coronary arteries. These arteries supply oxygen-rich blood to your heart.

Over time, plaque can harden or rupture (break open). Hardened plaque narrows the coronary arteries and reduces

the flow of oxygen-rich blood to the heart. This can cause chest pain or discomfort called angina (an-JI-nuh or AN-juh-nuh).

If the plaque ruptures, a blood clot can form on its surface. A large blood clot can mostly or completely block blood flow through a coronary artery. This is the most common cause of a heart attack. Over time, ruptured plaque also hardens and narrows the coronary arteries.

CABG is one treatment for CHD. During CABG, a healthy artery or vein from the body is connected, or grafted, to the blocked coronary artery. The grafted artery or vein bypasses (that is, goes around) the blocked portion of the coronary artery. This creates a new path for oxygen-rich blood to flow to the heart muscle.

## Procedure

The patient is brought to the operating room and moved onto the operating table.

An anaesthetist places intravenous and arterial lines and injects an analgesic, usually fentanyl, intravenously, followed within minutes by an induction agent, to render the patient unconscious.

An endo tracheal tube is inserted and secured by the anaesthetist and mechanical ventilation is started. General anaesthesia is maintained with an inhaled volatile anesthetic agent.

The chest is opened via a median sternotomy and the heart is examined by the surgeon.

The bypass grafts are harvested then. When harvesting is done, the patient is given heparin to inhibit blood clotting.

In the case of off-pump surgery, the surgeon places devices to stabilize the heart.

In the case of on-pump surgery, the surgeon sutures cannulae into the heart and instructs the perfusionist to start cardio pulmonary bypass (CPB). Once CPB is established, there are two technical approaches: either the surgeon places the aortic cross clamp across the aorta and instructs the

perfusionist to deliver cardioplegia with a cooled potassium mixture to stop the heart and slow its metabolism or performing bypasses on beating state (on-pump beating).

One end of each vein graft is sewn on to the coronary arteries beyond the obstruction and the other end is attached to the aorta one of its branches. For the internal thoracic cavity, the artery is severed and the proximal intact artery is sewn to the LAD beyond the obstruction. Aside the latter classical approach, there are emerging techniques for construction of composite grafts as to avoiding connecting grafts on the ascending aorta (Un-Aortic) in view of decreasing neurologic complications.

The heart is restarted; or in "off-pump" surgery, the stabilizing devices are removed. In cases where the aorta is partially occluded by a C-shaped clamp, the heart is restarted and suturing of the grafts to the aorta is done in this partially occluded section of the aorta while the heart is beating

**Protamine is given to reverse the effects of heparin.**

**Chest tubes are placed in the mediastinal and pleural space to drain blood from around the heart and lungs.**

**The sternum is wired together and the incisions are sutured closed.**

The patient is moved to an intensive care unit (ICU) or cardiac universal bed (CUB) to recover. Nurses in the ICU monitor blood pressure, urine output, respiratory status, and chest tubes or excessive or no drainage. Excessive drainage suggests continued bleeding which may require re-operation to manage; no drainage suggests an obstructed tube, which can result in cardiac tamponade which can be lethal.

After awakening and stabilizing in the ICU for 18 to 24 hours, the person is transferred to the cardiac surgery ward. If the patient is in a CUB, equipment and nursing is "stepped down" appropriate to the patient's progress without having to move the patient. Vital sign monitoring, remote rhythm monitoring, early ambulation with assistance, breathing exercises, pain control, blood sugar monitoring with intravenous insulin administration by protocol, and anti-platelet agents are all standard of care.

**The patient without complications is discharged in four or five days.**

**After the procedure**

**In the hospital**

After the surgery you may be taken to the recovery room before being taken to the intensive care unit (ICU) to be closely monitored. Alternatively, you may be taken directly to the ICU from the operating room. You will be connected to monitors that will constantly display your electrocardiogram (ECG or EKG) tracing, blood pressure, other pressure readings, breathing rate, and your oxygen level. Coronary artery bypass surgery requires an in-hospital stay of several days or longer.

You will most likely have a tube in your throat so that breathing can be assisted with a ventilator (breathing machine) until you are stable enough to breathe on your own. As you continue to wake up from the anesthesia and start to breathe on your own, the breathing machine will be adjusted to

allow you to take over more of the breathing. When you are awake enough to breathe completely on your own and you are able to cough, the breathing tube will be removed. In general, the breathing tube will be removed quickly after the operation, usually the same day or by early the next morning. The stomach tube will also be removed at this time.

After the breathing tube is out, your nurse will assist you to cough and take deep breaths every two hours. This will be uncomfortable due to soreness, but it is extremely important that you do this in order to keep mucus from collecting in your lungs and possibly causing pneumonia. Your nurse will show you how to hug a pillow tightly against your chest while coughing to help ease the discomfort.

The surgical incision may be tender or sore for several days after a CABG procedure. Take a pain reliever for soreness as recommended by your physician. Aspirin or certain other pain medications may increase the chance of bleeding. Be sure to take only recommended medications.

You may be on special IV drips to help your blood pressure and your heart, and to control any problems with bleeding. As your condition stabilizes, these drips will be gradually decreased and turned off as your condition allows.

Once the breathing and stomach tubes have been removed and your condition has stabilized, you may start liquids to drink. Your diet may be gradually advanced to more solid foods as you are able to tolerate them.

When your doctor determines that you are ready, you will be moved from the ICU to a postsurgical nursing unit. Your recovery will continue to progress. Your activity will be gradually increased as you get out of bed and walk around for longer periods of time. Your diet will be advanced to solid foods as you tolerate them.

### **Arrangements will be made for a follow-up visit with your doctor.**

#### **At home**

Once you are home, it will be important to keep the surgical area clean and dry. Your doctor will give you specific bathing instructions. The sutures or surgical staples will be removed during a follow-up office visit, in the event they were not removed before leaving the hospital.

You should not drive until your doctor tells you to. Other activity restrictions may apply.

Notify your doctor to report any of the following:

Fever and/or chills

Redness, swelling, or bleeding or other drainage from the incision site

Increase in pain around the incision site

Your doctor may give you additional or alternate instructions after the procedure, depending on your particular situation.

#### **Reference**

<http://www.nhlbi.nih.gov/health/health-topics/topics/cabg>

[http://en.wikipedia.org/wiki/Coronary\\_artery\\_bypass\\_surgery](http://en.wikipedia.org/wiki/Coronary_artery_bypass_surgery)

[http://www.hopkinsmedicine.org/healthlibrary/test\\_procedures/cardiovascular/coronary\\_artery\\_bypass\\_graft\\_surgery\\_cabg\\_92,p07967/](http://www.hopkinsmedicine.org/healthlibrary/test_procedures/cardiovascular/coronary_artery_bypass_graft_surgery_cabg_92,p07967/)