Coronary Artery Bypass Surgery

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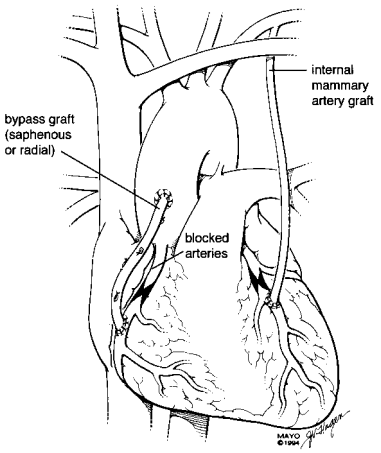
Coronary artery disease (also known as CAD) is the most common cardiovascular disorder in adults. It is caused by the build-up of cholesterol deposits in the wall of the coronary arteries that convey the blood to the heart muscle (myocardium). These deposits limit the flow of blood through the coronary arteries. Coronary artery disease often results in heart attack (myocardial infarction) or chest pain (angina pectoris), even in the absence of prior symptoms. Warning signs of a heart attack have been well outlined in a previous publication.[1] Treatment for coronary artery disease can include changes in lifestyle, diet modification, weight reduction, and cholesterol reduction,[2] as well as control of diabetes and high blood pressure (if either or both are present). Smoking cessation is essential.[3] Many patients can be adequately treated with medications. Some individuals, however, will require invasive treatments such as stretching (dilatation) of the coronary arteries with a balloon (percutaneous transluminal coronary angiography or PTCA) or coronary artery bypass surgery.

What Is Coronary Artery Bypass Surgery?

Coronary artery bypass surgery (CABG) involves creating new arteries to provide blood to the heart by use of other blood vessels as conduits to bypass the obstructions in the patient's coronary arteries (Figure). In most cases, the surgeon constructs at least one of the bypasses by using an artery called the internal mammary artery that is located behind the breastbone or sternum. Other bypasses may be constructed by using a vein from the leg (saphenous vein) or an artery from the forearm (radial artery). In almost all cases, the operation requires an incision in the midline of the chest (sternotomy). During most bypass operations, the heart is stopped and is connected to a heart-lung machine that does the work of both the heart and the lungs (cardiopulmonary bypass). If the surgeon's assessment is that the operation could be done without the heart-lung machine, the surgery may be performed while the heart continues to beat (off-pump CABG). Not all patients are suitable for off-pump surgery, however, and off-pump surgery still requires a sternotomy.

Which Patients Need Coronary Artery Bypass Surgery?

Many patients with coronary artery disease will require more aggressive therapy other than medications and lifestyle modification. For patients who have severe chest pain (angina) or severe obstruction of the coronary arteries, further treatment may involve either enlargement of the coronary arteries by balloon dilatation (PTCA) or bypass surgery. Your cardiologist and cardiac surgeon will decide what is the most appropriate treatment for you. The location, the extent, and the number of obstructions in the arteries often dictate what is the most appropriate treatment for any particular individual. Patients who have undergone PTCA in the past may need bypass surgery in the future if their coronary disease progresses. Patients who have no symptoms but who have evidence of impaired blood supply to the heart muscle (ischemia) or poor function of the pumping chamber of the heart (left ventricle) may require



Coronary artery bypass grafts allow blood to flow directly from the aorta to the heart muscle by going around the obstruction in the vessels.

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surgery to improve heart function and prolong survival. This applies particularly to diabetic patients. CABG is also often performed at the same time as a heart valve operation or before other major surgery, such as abdominal aneurysm surgery.

What Should I Expect in the Hospital?

In non-urgent cases, patients are usually admitted to hospital on the same morning as the surgery. General anesthesia is always used, and surgery may take 3 to 5 hours, depending on the complexity of the case. Under anesthesia in the operating room, a breathing tube (endotracheal tube) is inserted through the mouth. This tube helps patients breathe both during and after the surgery and allows the medical staff to clear secretions from the lungs. After surgery, patients are usually admitted to an intensive care unit for 1 or 2 days. While in the intensive care unit, breathing is assisted for several hours with a ventilator. The breathing tube is usually removed within 2 to 4 hours after surgery. Medications are given to relieve pain, and intravenous fluids are used to maintain hydration. One or more temporary drainage tubes exit from the chest cavity to drain any excess blood or fluid that may build up after the surgery. Many patients will require blood transfusions during or after the operation.

Within 24 hours of surgery, most patients are out of bed, and they are able to walk within 1 or 2 days. Over the next few days, patients usually regain sufficient strength so that they can be discharged within 5 to 7 days after surgery. The most common complication after bypass surgery is an irregular rapid heart rate (atrial fibrillation). In most cases this can be adequately treated with medications. More serious but less common complications are stroke (in 1% to 2% of patients) and infection of the sternum (in 1% to 2% of patients).

What Should I Expect After Leaving the Hospital?

In most instances recovery is rapid. Most patients are able to drive in about 3 weeks. Sexual activity can be resumed in 3 to 4 weeks. The main limitation to activity is healing of the sternum. Like any bone that is divided, the sternum may take up to 12 weeks to fully heal. Therefore, strenuous upper limb activities that would put extra stress on the sternum should be avoided during this time.

When Can I Return to Work?

Return to work will depend on rate of recovery, as well as the physical and emotional demands of your job. If you have a relatively sedentary job, then you may be able to return to work as early as 4 to 6 weeks after the operation. However, if your occupation involves heavy manual activity (for example, construction work or lifting heavy weights), you may not be able to return to full activity for up to 12 weeks. Consultation with your cardiologist will help you to determine the timing of your return to work.

Should I Enroll in a Rehabilitation Program?

Although not essential, a formal cardiac rehabilitation program will help to monitor your progress and get you back to full activity sooner. In addition, you will receive advice and support regarding lifestyle changes, weight reduction, dietary management, and levels of exercise activity for which you should aim. Again, consultation with your cardiologist and surgeon will help you to determine if a cardiac rehabilitation program is appropriate for you and where you may find or enroll in such a program.

Will the Bypass Surgery Cure my Coronary Artery Disease?

No. Bypass surgery will improve blood supply to the heart, relieve symptoms, and in some instances prolong life. However, with time, further disease in the coronary arteries or grafts can develop. Therefore, it is essential that you control the risk factors that can lead to coronary artery disease. These measures include weight reduction (if overweight), smoking cessation, reduction of cholesterol (if elevated), maintenance of normal blood pressure, and control of diabetes (if applicable). Almost all patients should take aspirin (81 mg) indefinitely after surgery. You may be prescribed other medications such as beta-blockers, angiotensin-converting enzyme (ACE) inhibitors, medications to control heart rate irregularities, and cholesterol lowering agents.

What Follow-Up Care Will I Need?

You should be seen at regular intervals by your local doctor to monitor the control of risk factors, particularly cholesterol, blood pressure, and diabetes, and at least annually by your cardiologist to monitor your coronary artery disease. After bypass surgery, most people enjoy many years of excellent health with relief of symptoms and are able to return to work with full activities.

Management of Patients After Coronary Bypass Surgery

A	Aspirin Abstain from smoking ACE inhibitors (for poor heart function)
B	Blood pressure control beta-blockers
C	Cholesterol management
D	Diet Diabetic control
E	Exercise
F	Follow-up

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