



X-Plain[™]

Coronary Artery Bypass Graft

Reference Summary

Introduction

Sometimes people have serious problems with their heart and the arteries that go into it.

Coronary artery bypass graft surgery, or CABG, bypasses clogged arteries in the heart to improve blood flow to the heart and prevent more serious heart problems.

If your doctor recommends a CABG, the decision whether or not to have the procedure is also yours. This reference summary will help you better understand the benefits and risks of this surgery.

Anatomy

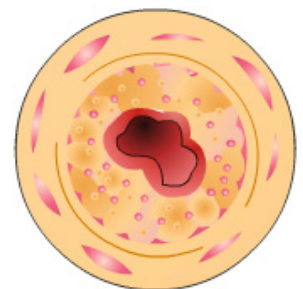
The heart is the most essential muscle in the body. Its main function is to pump the blood to the lungs and to the rest of the body.

Since the heart is living tissue, it needs blood like the rest of the body. Therefore, it pumps blood to itself through many blood vessels that go directly to the heart muscle. These are known as coronary arteries.

Symptoms and Their Causes

Cholesterol deposits accumulate in the coronary arteries, forming “plaques” that narrow the arteries. Narrowed arteries do not let enough blood go through. This causes blood flow to decrease, which can cause heart attacks.

Heart attacks cause a part of the heart muscle to die. This will cause a weakness in the pumping function of the heart. If this is severe, it can lead to death.



Narrowed Artery

Alternative Treatments

Healthy diet and medications that lower your blood cholesterol can help slow the process that clogs arteries.

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Exercise and losing weight, under your doctor's supervision, may help strengthen your heart.

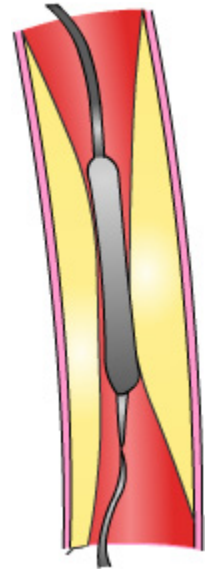
Quitting smoking is essential to protect your heart and decrease the chances of future heart problems.

If you have already had a heart attack, medications that control your blood pressure and heart rate can help decrease the chances of another heart attack.

Angioplasty, or opening the arteries using small balloons, is possible in some cases for improving blood flow. CABG surgery is done if the above non-surgical treatments have failed.

There are two types of CABG surgery involving an incision in the middle of the chest, one using a heart-lung bypass machine (pump) and one performed without the heart-lung bypass machine (off-pump).

This reference summary discusses the operation that necessitates a heart-lung bypass machine.



Angioplasty

Procedure

This operation is performed under general anesthesia, which puts you to sleep. The surgeon then opens your chest in the middle. The breastbone is also opened in the middle so that the surgeon can reach the heart.

At that time, special tubes are attached to the biggest veins and arteries of the body, close to the heart.

The blood is then rerouted from the heart to a heart-lung bypass machine, a special machine that pumps blood through the body and loads it with oxygen. This machine takes over the job of the heart and lungs while the heart is being worked on.

The heart is then chemically stopped to allow the surgeon to operate on it. During that time, the blood is continually circulated in the body and loaded with oxygen by the bypass machine. Veins taken from the legs or from arteries going to the chest wall or from the arm (radial artery) are then used to bypass the clogged arteries in the heart. Once the new blood vessels are connected, blood can flow through them better than the clogged arteries.

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This process of taking blood vessels from one part of the body and connecting them in another part is called grafting.

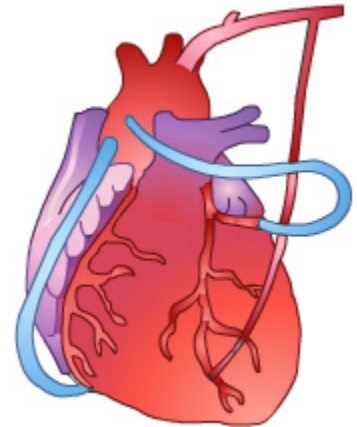
The decision on which kind of graft to use depends on how many arteries need bypassing and the quality of your blood vessels. If veins are used, they are usually taken from your legs through multiple small incisions. If an artery is used, then it is usually rerouted from the inside of the chest wall to its final location using the same chest incision. The radial artery may also be used as a graft.

After completing the grafts, the surgeon restarts the heart, and the blood is allowed to go back through the heart again. Pacing wires are placed on the surface of the heart. In rare instances, these can be used to help restart the heart or to control its rate.

These wires are brought out through the skin and hooked to a machine called a pacer. This is usually temporary and the wires are pulled out a few days later.

After the heart is restarted, the breastbone is sutured together, and the chest and leg incisions, if any, are closed.

Tubes may also be placed to drain excess blood from around the heart or the lungs. These are respectively known as mediastinal and chest tubes. They are connected to containers close to your bed.



Coronary artery
bypass graft

Risks and Complications

This surgery is very safe. There are, however, several possible risks and complications. These are unlikely but possible. You need to know about them just in case they happen. By being informed, you may be able to help your doctor detect complications early.

The risks and complications include those related to anesthesia and those related to any type of surgery.

Risks related to anesthesia and to the blood being rerouted to the bypass machine during the surgery include, but are not limited to: abnormal heartbeats called arrhythmia, pneumonia, kidney failure, blood clots in the legs, strokes, and death. These risks will be discussed with you in greater detail by your anesthesiologist or nurse anesthetist.



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Blood clots in the legs can occur. This usually shows up a few days after surgery. They cause the leg to swell and hurt a lot. These clots can be dislodged from the legs and go to the lungs where they will cause shortness of breath, chest pain, and possibly even death.

Sometimes the shortness of breath can happen without warning. It is therefore extremely important to let your doctors know if any of these symptoms occur. Getting out of bed shortly after surgery may help decrease the risk of blood clots in the legs.

Some of the risks are seen in any type of surgery. These include:

- Infection, deep or at the skin level. Infections can include the chest and/or leg incisions. Deep infections may involve the breastbone. Treating deep infections may require long-term antibiotics and possibly surgery.
- Bleeding from either incision, during or after the operation. This may require a blood transfusion.
- Skin scars.

Other risks and complications are related specifically to this surgery. These again are very rare. However, it is important to know about them. The bypass surgery may not succeed in bypassing the blockage. Even when the blockage is bypassed, the graft itself could, on rare occasions, get blocked. This could lead to a heart attack during, shortly after, or long after the surgery. In extremely rare cases, the heart may not restart, leading to death in the operating room.

Arrhythmia, or abnormal heartbeat, may occur after surgery. These can be controlled by medications and are usually temporary. Rarely, this can be permanent, requiring medications for life.

Removing the veins from the legs may cause swelling and aching of the legs. You may need to wear special stockings to decrease the swelling for some time. Nerves in the legs may also be injured, resulting in decreased sensation or skin numbness in the affected leg.

Persistent pain from the breastbone cut is unlikely but possible. The catheters placed in the various blood vessels can, in rare cases, injure them.

After the Surgery

When the operation is done, you are transferred to the Intensive Care Unit, or ICU, usually still asleep and on the respirator.

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Over the following hours, you are allowed to wake up and eventually taken off the respirator.

While on the respirator, you will be unable to speak. You will be kept comfortable.

As soon as you are stable and off the respirator, you are transferred to a regular hospital room to continue the recovery.

After the breathing tube is taken out you may be asked to use an incentive spirometer to “exercise” your lungs.



Incentive Spirometer

An incentive spirometer is a device that you hold against your mouth when you breathe in. It measures how deep you breathe. The deeper the breaths you take, the stronger your lungs become and the less likely you are to get a lung infection or pneumonia.

Your healthcare provider may ask you to use the incentive spirometer 10 to 20 times an hour.

As you begin to move around in bed, your incisions will feel painful and sore with pulling felt along the incision. These feelings may increase when you turn or cough.

Your nose and throat will be sore from having the breathing and stomach tube in. Lozenges and spray can help to ease this discomfort.

A soft, rubber tube that was inserted into your bladder during surgery is called a Foley catheter. This tube may make you feel like there is pressure in your bladder or that you have to urinate. In 1 to 2 days after surgery when this tube is removed, you may feel burning the first few times you urinate.

As you begin to take a more active role in your recovery you will notice that your surgical incisions are sore and there may be itching and/or numbness felt along them. You may also see bruising and/or slight redness around the area. This is part of the normal healing process and will disappear in time.

Your wrist may be bruised and sore. This is because of a blood pressure monitoring I.V. that was placed there during surgery. This too will improve in a few days.

When looking at your chest incision, you will see two small wires (pacing wires). These are placed on each side of your incision, just below your rib cage. These wires may be attached to a pacemaker to regulate your heart if needed. You will not be able to feel

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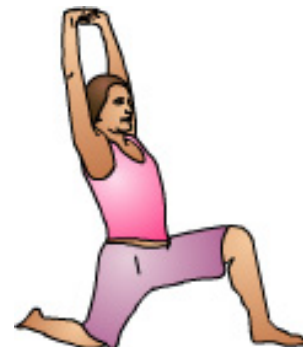
the wires attached to your heart. However, you may feel the tape that is used to secure the wires to the skin. These wires will be removed before you leave the hospital.

Your muscles will feel weak and sore for some time after surgery, but this too will improve.

Your doctor may recommend an exercise program to allow a gradual transition back to usual daily activities.

To decrease the chances of new blockages in your arteries:

- You should avoid smoking.
- You should eat healthy.
- You should lose excess weight.
- And you should exercise regularly, according to your doctor's recommendations.



Summary

Cholesterol deposits can block the coronary arteries. If this happens and other treatments fail, a coronary artery bypass graft surgery may be needed to prevent a heart attack or other heart problems.

A CABG surgery includes taking blood vessels from other parts of the body and grafting them to coronary arteries. These grafts bypass clogged blood vessels and allow increased blood flow to the heart muscles.

Make sure to contact your doctor in case of any new symptoms, such as chest pain, shortness of breath, weakness, swelling, infection, or fever. Also, inform your doctor in case you feel your heart is beating quickly, slowly, or skipping beats.

Coronary artery bypass graft surgery is relatively safe. Risks and complications are rare but possible. Knowing about them will help you detect them early if they happen.



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