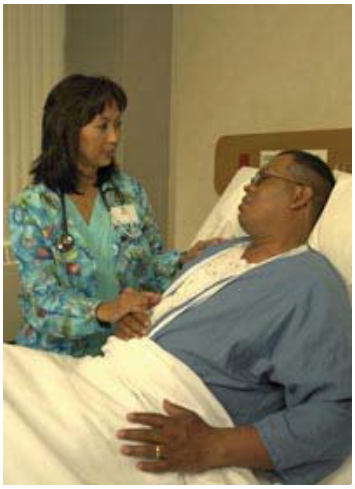
And the Beat Goes On...

Care Before and After Heart Surgery



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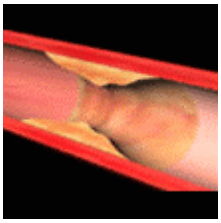
Introduction

Heart problems can take you by surprise. Suddenly, you are hunched over with chest pressure, pain, or even a heart attack. These are frightening symptoms of coronary artery disease. The coronary arteries are the large blood vessels that supply blood to the heart muscle. Coronary artery disease is the narrowing of the heart's arteries due to buildup of a substance called *plaque*. When fat, cholesterol, and minerals from the blood build up in the inner wall of the coronary arteries, these substances form plaque. This narrows the inside of the vessel; and can restrict blood flow through the coronary artery. Plaque can tear (rupture) in the vessel. This can cause a blood clot to form. If the clot blocks a coronary artery, a heart attack can result.



Cross-sectional view of a coronary artery with plaque buildup

When the coronary arteries are narrowed by plaque, less blood reaches the heart muscle. Exercise and emotional stress cause the heart to need more blood and may cause these symptoms. Fatigue, tightness in the chest, or a peculiar crushing-type chest pain called angina pectoris may accompany the decreased blood flow. Rest may relieve the symptoms. Still, chest pain signals a problem and should be evaluated by a doctor. When the blockages are more complicated and involve more coronary arteries, the doctor will usually recommend coronary bypass graft surgery.

Coronary artery bypass surgery creates a new pathway around the blocked part of your artery, allowing blood to reach your heart again. In most cases, a healthy blood vessel from another part of your body is used to restore blood flow. If you have more than one blockage, more than one bypass may be used. More blood flow to your heart should eliminate chest pain due to the coronary artery disease, reduce fatigue and the need for medication, increase your ability to be physically active, and restore a sense of well being. It may add years to your life.

Without bypass surgery or other treatment, coronary artery disease can be deadly. If blood flow through a coronary artery suddenly stops (usually because of a blood clot), part of the heart muscle may be permanently damaged. This is a heart attack. A heart attack is often accompanied by severe chest pain that won't go away.

With heart valve surgery, one or more heart valves can be repaired or replaced. Repair means that the valve is fixed to work better. Replacement means your own diseased valve is removed and a new valve is put in its place. The decision to repair or replace a valve often can't be made until after surgery has begun.

Please refer to the Heart Valve Surgery booklet for more information on valves and valve surgery.

Knowing the Risks

Bypass surgery is major surgery and, in spite of all reasonable precautions, problems can occur. Possible complications may include: lung problems, bleeding, wound infection, abnormal heart rhythms, kidney failure, heart attack, bypass graft occlusion, stroke, or death.

Neurological changes can also occur. These are most often experienced as memory loss and inability to focus. In most cases, such symptoms are temporary.

Factors that may increase the risk during surgery include: a weakened or damaged heart, advanced age, severe obesity, heavy smoking, and serious lung or kidney disease. The risk is also increased during emergency bypass surgery.

Although most patients do not experience major problems, you should know the risks. To learn about your particular risk, your doctor will talk to you.

Knowing the Benefits

The two main goals of bypass surgery are to relieve symptoms of angina and to prolong life.

The effect of surgery on relieving symptoms is often significant. About 90 percent of bypass patients either become free from angina symptoms or have fewer symptoms. Many patients remain totally free of angina symptoms for years.

The effect of surgery on prolonging life, on the other hand, is not as clear- cut. Most experts agree that surgery usually prolongs life in people who have disease of the left main artery or severe blockages in all three major coronary arteries.

Before Your Surgery

It's natural to feel anxious and nervous once you've made the decision to have open-heart surgery. You may feel less worried once you understand why you need the operation, meet the members of your medical team, and have your questions answered.

The Cardiac Services Coordinator, a Registered Nurse, will talk with you and your family about what you can expect while you are in the hospital. The Coordinator will also follow you during your stay in the hospital, and after discharge call you at home to follow up and answer your questions, making your transition from hospital to home more comfortable.

In preparation for your surgery, if you smoke, stop immediately to improve blood flow and breathing. You will be weighed before and after surgery to help manage fluids and medications given after surgery. Tell your doctor what medications you're taking, especially aspirin or anticoagulants, and ask if you should stop them.

If you are having valve surgery and need dental work, it should be done prior to surgery. This is because dental procedures often allow bacteria to enter the blood stream, which may cause infection around the new valve.

You may be admitted before your operation date so diagnostic tests or medications can be started prior to surgery. These routinely include blood and urine tests, an electrocardiogram, often shortened to ECG or EKG, (a graphic record of electrical impulses produced by the heart), chest X-ray, CAT scan, and other tests and procedures. Many times these tests can be done as an outpatient. If these tests have already been done, you'll be admitted directly for the operation, approximately two hours prior to the scheduled surgery time.

The anesthesiologist will talk to you about your medical health history and explain how medication will be given to keep you asleep and free of pain during surgery. Other members of the technical staff may come to draw blood, insert intravenous catheters (IVs), and tell you how to breathe and care for your lungs after the operation. You may need to have a blood transfusion during or after the operation. Please see the *For Your Well Being* **Receiving Blood or Blood Products**.

Prior to your surgery, your chest, groins, and legs will be clipped. You'll be asked to shower and wash with antiseptic soap to remove bacteria from your skin the evening before and the morning of surgery. This reduces the chance of infection. You will be asked not to eat or drink anything after midnight the night before surgery. This is to prevent vomiting during surgery.

You should remove personal items such as glasses, contact lenses, dentures or detachable bridgework, watches, and jewelry. Give them to family members for safekeeping.

You will be wheeled into the operating room on a rolling bed. After you're in the operating room, the anesthesiologist will give you an anesthetic that brings sleep and freedom from pain during the operation.

During the Surgery

Once you have been given anesthetic medications, you will be deeply asleep and unaware of the activity around you. A number of tubes and lines will then be inserted to help you breathe, to drain fluids, and to monitor your condition.

- *Preparing the Grafts*

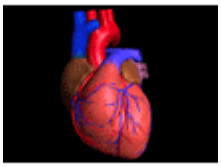
The surgery begins with the removal of the blood vessels that will form the bypass grafts. These may be sections of a vein in the leg, an artery from inside the chest or from the arm, or a combination of these.

One vessel used to make grafts is the saphenous vein in the leg. One or more incisions are made along the inside of the thigh or calf, and a section of the vein is removed. The vein is not crucial for blood flow in the leg, so it can be removed safely.

Another vessel used to make grafts is the internal mammary artery, one of two arteries supplying blood to the inside of the chest. The artery's upper end is left untouched, since it's already attached to a branch of the aorta. The lower end is separated from the chest wall and then used as a graft.

The radial artery in the arm is sometimes used to make grafts, although not as frequently as the internal mammary artery. The hand's blood supply comes from two arteries so the radial artery can be removed safely and used as a graft.

- *Opening The Chest*



Anterior view of the heart

The surgeon makes an incision down the middle of the chest, and the breastbone is divided in two. The breastbone's two halves are separated and held open during the operation. The surgeon then exposes the beating heart.

At this time, the surgeon will do the bypass operation in one of two ways, either using the heart-lung (pump) machine or doing what is called "beating heart" surgery. He will discuss with you prior to your surgery which way will be used for you.

During conventional bypass surgery, the heart is stopped. In order to do this safely and effectively, the patient is placed on the heart-lung machine (which is also referred to as being placed "on pump"). The heart-lung machine maintains circulation and does the work of the patient's heart and lungs, providing blood flow to the entire body. The heart lung machine has allowed cardiac surgery to be performed safely and effectively for many years.

In the past few years, technology has revolutionized how cardiac bypass surgery is performed. These advancements have allowed for a bypass operation to be done without the use of a heart-lung machine. It is referred to as "beating heart surgery," or "off-pump."

Beating heart surgery allows the heart to continue beating while the surgery is performed. A heart-stabilizing device immobilizes a small section of the heart that needs the bypass graft while the rest of the heart muscle continues to beat and pump blood to the body.

With both types of surgeries, a graft is attached to each coronary artery that needs to be bypassed. Therefore you many have "single," "double," "triple," or "quadruple" bypass, depending on the number of arteries or major branches that require a graft. With the graft in place, blood can flow freely into the coronary artery and to the heart muscle.

- *Completing the Surgery*

Once the grafts are securely in place, your heart can start pumping on its own again, and the heart-lung machine is disconnected, if it is used. As the surgeons complete the operation, they bring the breastbone back together with several pieces of stainless steel wire. These wires will remain in place permanently, so the bone won't shift when you move about during the healing period. (You won't be able to feel the wires.) The skin is then brought together using a glue-like substance called "dermabond"or staples.

Bypass and/or valve surgery takes from three to six hours. The length of time depends upon what has been done. Each operation varies in complexity, so the time it lasts can only be estimated.

Your family and friends can wait during surgery in the family waiting area on the third floor. The surgery team will call and notify them when the surgeon has started surgery and when you come off the heart-lung machine. The surgeon will also speak to them once the operation is over.

- *After Your Surgery*

You'll be taken to the third floor intensive care unit (ICU) where your condition will be constantly monitored during the early stages of recovery. Your family may visit briefly in the ICU within an hour or two after your operation. You will probably still be asleep at that time.

- *Waking Up in the ICU*

When you wake up after surgery, you may feel sore, cold, and perhaps disoriented. These sensations are common, and they won't last long. You'll notice a variety of tubes and devices that were put in place while you were asleep. These devices help your doctors and nurses observe you closely and care for you during your recovery.

- A heart monitor continuously records your heart's electrical activity. If an abnormal heart rhythm develops, your nurse can recognize it immediately.
- A breathing tube is placed in your throat while you are asleep. The tube is connected to a ventilator that helps you breathe during and after surgery.
- Chest tubes are inserted during surgery and are used to drain blood and other fluids that tend to build up around the heart. These tubes come through the chest wall and are attached to a drainage device.
- Other tubes and lines may be inserted during or after the operation. These include: intervenous lines to give you fluids and drugs; an arterial catheter to monitor blood pressure and provide blood samples for lab studies; and a urinary catheter to drain the urine from your bladder.

- *What To Expect In the ICU*

Because the breathing tube passes alongside your vocal cords, you won't be able to talk while it is in place. You'll be able to communicate by making gestures or writing notes. The breathing tube is taken out as soon as you are awake enough to breathe on your own, usually within a few hours of the operation.

Deep-breathing exercises and coughing are important in helping in your recovery. Coughing reduces the chances of pneumonia and fever and won't harm the incision or bypass grafts. Most patients are afraid of pain or discomfort and don't like to cough after an operation. Still coughing is essential. You will be given a pillow to help support your chest while coughing.

It is common to have some pain after the operation, especially at the incisions and chest tube sites. You will be given medications to relieve pain, whatever the cause.

The tubes and lines that were inserted during the operation will gradually be removed.

Once your breathing tube is removed, you'll be able to swallow liquids. How quickly you can progress from liquids to a regular diet depends on your own digestive system.

It's hard to keep track of time in an area where the lights are on 24 hours a day and where there's constant activity. Consequently, you may become disoriented and confused, particularly at night. Pain medicines also may make you feel confused. Temporary confusion isn't serious and will go away within a day or two after you've moved to a quieter, less-intensive unit. As you're able to rest, normal patterns of sleep, wakefulness and thought processes will return.

You may get out of bed and sit in a chair or walk around the room as soon as you can, usually within a day. A physical therapist or nurse from the cardiac rehabilitation program will guide you through daily exercises, such as walking around the unit or climbing stairs. They will also give you an exercise plan to follow after you get home and make a referral into a cardiac rehab program that is close to where you live.

You can have sponge baths right away. In a few days you'll be able to take a shower.

After your operation, your chest incision will be covered with an antibacterial dressing that will remain in place for 6-7 days. The number and length of leg incisions varies from patient to patient. It depends on how many vein grafts the surgeon must make. Some patients have an incision in just one leg while others have incisions in both. Later these incisions will be washed gently with soap and water.

Your ankles may swell. You may also feel a burning sensation when standing up on the leg where the graft was taken. Elastic support stockings help circulation and reduce swelling. Walking helps blood circulate in your legs and also help your heart. Stitches or staples will be removed from your legs if they are present about a week after your operation.

These wounds require about six weeks to heal completely. It's smart to avoid lifting heavy objects during this time. The color of the wound will gradually change from purple to red to pink, returning to normal after several months.

- *Moving Out of the ICU*

When you no longer need close monitoring, usually within a day or two after surgery, you'll be moved to a regular hospital room. You'll still be continually observed for fever, infection of the incision sites, and abnormal rhythms. Your heart rhythm will continue to be monitored during your hospital stay. You will wear a device that monitors your ECG and relays the signals to the nurse's station.

You will be encouraged to increase your activity levels gradually. As your strength improves, you'll be able to extend the time you spend out of bed and walking.

The usual length of stay for cardiac surgery patients is four to six days after surgery. How long you stay will depend on your progress. During that period, and beyond most patients have "good days" and "bad days" with overall progress and a gain in strength.

- *Returning Home*

It's not unusual to feel nervous or depressed about returning home. Sometimes these feelings are prompted by concerns about leaving the security of the hospital, with its expert medical team and equipment. Home care, by comparison, may seem uncertain. If any special discharge needs are identified, the Cardiac Services Coordinator and Discharge Planner will help to arrange for those needs to be met. Before you leave the hospital, your nurse will talk with you about medications, the type of foods you can have, and the activities you can safely do at home. Your return appointment to see the doctor will also be arranged before you leave. Feel free to ask questions.

It's common to feel weak when you return home. After a hospital stay you may feel tired and weak when trying to resume the routine of home life. The healing of your incisions takes a tremendous amount of energy and depletes body strength. This demand for energy drops significantly about three to four weeks after the operation. Exercising is a good way to regain your strength. Walking is especially beneficial after heart surgery.

- *Your Feelings*

While recovering from this kind of major surgery it is common to feel depressed, frustrated, or angry. You might feel cheerful and energetic one day, then cranky and tired the next day. You may find it hard to concentrate or you may have trouble sleeping. Remind yourself that these things are only temporary. And don't withdraw from the people around you—stay involved with your family and friends. Keep talking, listening, and supporting each other.

Recovery from open- heart surgery affects more than just the person who actually went into the operating room. Family and friends are part of the whole event and are also affected. It is important that family and friends take time to take care of themselves. It can be very stressful helping to care for someone after surgery. Research has shown that if family caregivers do not take the time for themselves, they may become ill. Rest, talking about feelings, and time spent doing things that are enjoyable can make this time more pleasant. Sometimes participating in exercise and activities with a loved one can make them more enjoyable. This can be helpful to all.

- *Rest and Sleep*

Sleep problems are common following open- heart surgery. There are several common causes. Pain may be one. Some people wake up from sleep after the pain medication has worn off. If this happens, you may want to take a pain pill before going to bed.

Those who sleep during the day may have a hard time sleeping at night. If this happens, you may want to limit the amount of time that you sleep during the day. Sometimes resting instead of actually sleeping in the afternoon helps. Increasing activity during the day may also help you to have a more restful sleep at night.

Creating a bedtime routine may be helpful. Reading or listening to soothing music may help you to relax and fall asleep. A glass of warm milk may work. If after you try these, and you still are having trouble sleeping, call your doctor.

- *Medications*

Only take medicines your doctor has prescribed for you. Don't keep taking medicines you took before the operation unless they are specifically prescribed. Don't use even over-the-counter (non-prescription) drugs like Tylenol or ibuprofen without first asking your doctor.

- *Home Routine*

Try to follow these guidelines:

- Get up at a normal hour.
- Shower
- Always dress in regular clothes.
- Take time to rest in the mid-morning and mid-afternoon or after periods of activity.

Rest periods after activity are helpful. After a morning walk of a few blocks, take a short nap when you get home. Remember the ability to do more comes with time, and walking is one of the healthiest and best activities to help you recover. When you walk, your legs pump blood back to your heart, improving blood flow throughout your whole body. Walking may also help control the leg swelling that may occur if you had a leg incision. Wear supportive shoes to prevent injury to knees and ankles.

You will be asked to wear support stockings for a month after surgery. If your ankles swell, elevate your legs on pillows a few times a day for an hour each time. Keep your legs elevated when sitting and avoid standing for long periods of time.

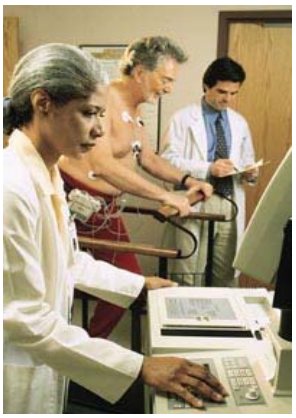
- *Incision Care*

Continue your incision care as you did at the hospital, gently wash your incisions with a clean wash cloth each time, using mild soap (such as Ivory, Dial, or Zest) and water. Then pat dry. Do not use soaps that contain perfumes or lotions. Do not take tub baths.

Do not put ointments, lotions, creams, or powders on your incisions until they are completely healed. Be sure to protect your incision from sunburn for at least six months.
Remove your chest incision dressing as directed. Inspect your incisions daily for signs of infection. Look for increased redness, fever, swelling, tenderness, or drainage. Notice what your incision looks like when you leave the hospital and use this as a guide for when you are at home. If there is drainage or pus, note the color and smell. If you see changes in your incision, or if you have questions about your incision call your doctor.
Occasionally, light red watery drainage may ooze from your incision or chest tube site. This is normal. Change the dressings as needed when it feels wet. Leave the site open to air once it stops draining. You may want to wear an old T-shirt under your clothes to protect your clothes from the drainage until it stops.

- *Activity*

Because of your chest incision, your doctor won't want you to lift any objects weighing more than ten pounds or a gallon of milk. You should have no problem doing any of these activities: helping with light work around the house; going to the theater, restaurant, store or church; visiting friends; going for a ride in the car; or climbing stairs.



Your doctor will refer you to an outpatient cardiac rehabilitation (cardiac rehab) program. The program is designed to help patients who have had a heart attack or heart surgery recover and get back to normal more quickly. The program consists of monitored exercise sessions, education, and counseling.

Difficulties in sexual relations after heart surgery are often due to Poor communication between partners. It is important that you openly discuss your fears and concerns with each other. You may resume sexual relations when you feel physically comfortable, usually about two to three weeks after you leave the hospital. Choose positions that require less effort and put less strain on the breastbone, such as lying side-by-side or active partner on top. Try to avoid supporting your body weight on your arms.

Stop sexual activity if you begin to experience chest pain or discomfort, shortness of breath, palpitations or dizziness. Wait for the symptoms to go away before you resume activity. Let your doctor know if the symptoms recur.

- *Returning to Work*

If you have a desk job, you should be able to go back to work in four to six weeks after surgery. If you have a physically strenuous job, you may need to wait six to eight weeks, or longer. Your doctor will tell you when it is all right for you to return to work.

- *Driving*

Let others drive you for two to four weeks; you may ride as a passenger in a car at any time. Driving is restricted for two main reasons: to protect your breastbone as it heals, and to allow your reflexes (slowed after surgery) to return to normal. Your surgeon will tell you when you can return to driving. Do not drive after taking pain medication.

- *Dental Treatment*

You won't need any special precautions during dental treatment after bypass surgery. If you're taking aspirin or Plavix, be sure to tell your dentist. If you have had valve surgery, antibiotics must be taken before any dental work-including routine cleaning- or any other medical procedure. This medication helps prevent bacteria from getting into your bloodstream and causing an infection on or around your new heart valve. Tell all doctors or dentists you visit that you've had valve surgery.

- *Lifestyle Changes*

Bypass surgery is done to restore a person to an active and full life. This includes making it possible to have a sense of well-being, return to work or active retirement, be physically active, enjoy hobbies, etc.

You may need to change some aspects of your lifestyle or habits. Only you can make that decision. It makes sense to reduce the risk factors of heart attack that you can control. This means…

- Don't smoke, and avoid others' tobacco smoke
- Keep your blood pressure in a healthy range (below 120/70 mm Hg) or even lower if you have diabetes, heart failure, or certain kidney problems.
- Keep your blood cholesterol below100 mg/dL by eating less saturated fat and cholesterol.
- Be physically active by gradually building up to a total of 30-60 minutes of exercise three to four (3-4) days per week.
- Keep your weight at a healthy level. (Avoid being overweight or obese.)
- Manage diabetes (if you have it.)

Some doctors recommend that heart patients avoid internal or external time pressures and situations that regularly make them angry or hostile. Sometimes you can diminish the sense of time urgency by consciously deciding to slow down and increasing your leisure. If you know a situation may anger you, try to avoid it----and if possible, talk about it with those involved.

Making these changes in your lifestyle and following your doctor's instructions are essential for getting the most long-term benefit from your surgery.