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PREPARING FOR CARDIAC SURGERY

PATIENT BOOKLET

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CABG (Cornary Artery Bypass Grafting) or Valve Repair/Replacement

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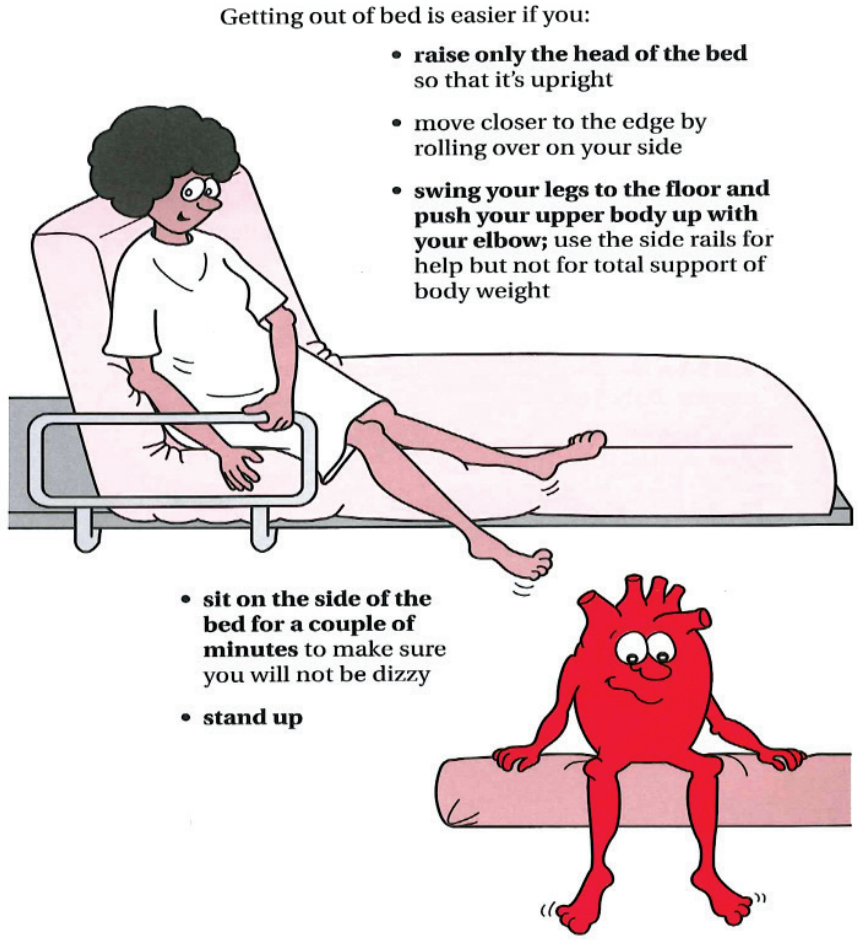
available to help with sitting and walking. Everyone will be different and will progress at different rates, but will progress the same: sitting on the edge of the bed to standing and walking in the hallway.

- Deep breathing and coughing will improve with walking.
- It is also important to remember to stand up straight and look forward while walking. This may be painful but balance and posture must be maintained while walking.



"Going for Heart Surgery" Pritchett & Hull Associates

- Have their weight checked daily.
- Use an Incentive Spirometer (coughing and deep breathing) at least ten times every hour while awake.
- Shower daily with assistance.
- Be encouraged to move while in bed.

Incisions

The patient will be assisted with daily showers. The patient will be given instruction on the proper way to clean the incisions when at home. After showering it may be best to leave the incisions open to breathe or covered with a porous dressing. This will be decided by the doctor or nurse.

Heart Monitor

The heart will be constantly monitored while on the 12 South. Monitoring the heart allows the nurses, aids and therapists to see the heart rhythm at all times. The monitor is about the size of a deck of cards and will fit into the pocket of the patient's gown.

Diet

Once the patient gets their appetite back, their diet will move from a soft/liquid diet to a more regular diet. Additionally, the doctor may decide to follow a more heart healthy diet. There are dieticians within the hospital that can advise the patient about their diet when at home. It is important to know this information when discharged from the hospital.

Breathing Exercises

The patient will be on oxygen after surgery. The need for oxygen at home will depend on how well the patient is doing with their breathing exercises. Often, patients will be weened from oxygen as long as they are performing deep breathing exercises, coughing and walking.

Activity

Activity level is very important for heart patients prior to leaving the hospital. Each day the patient will begin to feel better and stronger. Walking is the best way to increase blood circulation and will help with deep breathing and coughing. At first, the patient will be assisted with walking and moving activities. There will be therapists and specialists who come in the room to check all activity progress. These professionals will include physical therapists, occupational therapists, and cardiac rehabilitation specialists. These therapists/ specialists are trying to help the patient get strength back so that the patient leaves the hospital with confidence and ease. After being treated by the specialist, the patient can walk on their own or with family. If the patient decides to walk on their own, have the nurse assist with disconnecting the compression stockings and oxygen.

- The sooner the patient is up and moving, the faster recovery will occur.
- The nurse or therapists will be

PROCEDURES

Heart surgery may be scheduled in advance or it may be performed in an urgent or emergency situation because of a heart problem. Those problems could be a sudden onset of angina, heart failure or a heart attack. The two most widely used heart surgeries are Coronary Artery Bypass Graft and Heart Valve Surgery.

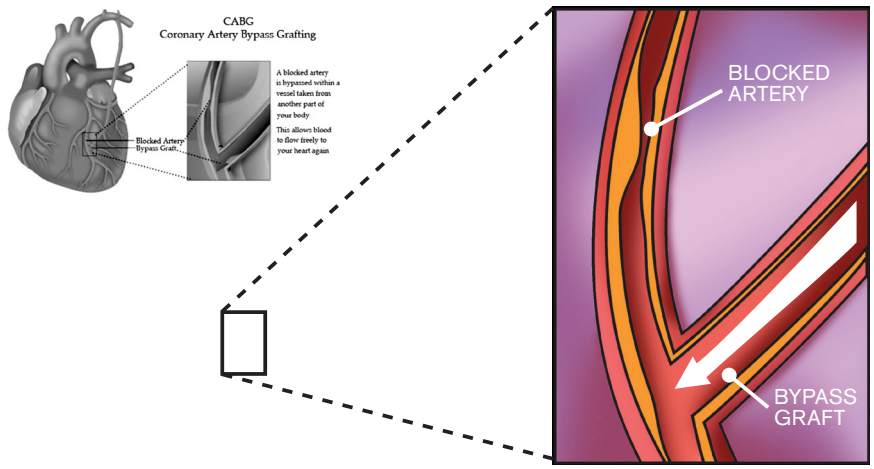
CORONARY ARTERY BYPASS GRAFTING CABG ("CABBAGE")

The main goal of this surgery is to improve blood flow to all of the different parts of the heart and the rest of the body. During this procedure the surgeon will use a blood vessel from another part of the body to attach to the artery to bypass the blockage causing the problem. The doctors are simply trying to make a "new route" for the blood to flow. This new route will help to relieve chest pain and any other cardiac symptoms that may be occurring.

There are several different vessels that can be used as the donor graft for the CABG surgery. It is very helpful for the surgeon to have options in order to make sure the surgery will be a success. These options include:

- Saphenous Veins from the legs.
- Internal Mammary Artery from the chest wall.
- The Radial Artery from the arm.

The surgical team will decide through testing which vessels would be the best to use. The number and type of bypasses needed are based on the findings from all the



CABG – Coronary Artery Bypass Grafting
A blocked artery is bypassed within a vessel taken from another part of your body. This allows blood to flow freely to your heart again.

tests performed before surgery. The location of the incision depends on the type of surgery that the surgeon will perform. Examples of locations include: mid-line chest sternotomy (the center of the chest, down your sternum), thoracotomy (side of the chest wall) or minimally invasive incisions with or without robotic assist when indicated.

HEART VALVE SURGERY

Through testing the doctor will be able to determine if there is a problem with the valves of the heart that will need to be fixed. This may require surgery to repair or replace the problem valve. If the valve (mitral) needs to be repaired, the surgeon would usually support the repair with a prosthetic ring. If a valve needs to be replaced there are a number of factors to be considered such as age, heart size, the condition of the heart and the patient's lifestyle to determine the type of valve that will work best.

Types of Heart Valves

- Mechanical Valves are made of hard plastics, metal and cloth that make them very durable. People that have a mechanical valve must be on a blood thinning medication for the rest of their lives in order to keep the valve surface smooth and to prevent against blood clots. While on those blood thinning medications the doctor will want to monitor all blood levels with periodic blood tests.
- Biological Valves are made of animal tissue (pigs, cows and horses) very similar to the human valve they are replacing. These valves are usually

Prosthetic Ring (Valve Repair)

Mechanical Valve

Biological Valve

(Red Heart Pillow) will be given to the patient to place across the chest incision when coughing or sneezing. This pillow will support the breastbone and help with some of the pain and discomfort while coughing and doing deep breathing exercises. For patients with a higher risk of poor breastbone healing, a "Heart Hugger" may be used with coughing and sneezing. This "Heart Hugger consists of straps around the chest with two handles. During coughing or sneezing, the two handles need to be brought together to help soothe the pain.

- An Incentive Spirometer (breathing device) should be used every hour while awake. This device is used to measure any progress with deep breathing and coughing after surgery. Even though it may be painful, it is very important to cough deeply while using this machine. By coughing, the extra mucous in the lungs from the surgery will be removed from the body. The patient should be instructed and become familiar with the device prior to surgery. Try to remember the level that was reached before surgery so a goal can be set to reach after surgery.
- Different breathing techniques/therapies are used to help clear the lungs. If the doctor feels it will help, a breathing treatment will be ordered to help open (dilate) the bronchial tubes. The breathing treatment will help with shortness of breath by helping the lungs get their strength back.

MOVING FROM THE CORONARY CARE UNIT (CCU) AND THE "STEP DOWN UNIT"

- Once the patient is recovering well, they will be transferred to 12 South. This is considered to be a "step down unit." The patient will still be monitored but will be able to move around more independently and complete certain daily tasks.
- The patient must get enough rest while in the hospital. Family members need to be aware of the hospital's visiting hours. They are welcome to visit but need to let the patient rest.

RECOVERY

As part of care on the step down unit, the patient can expect to

- Sit up in a chair for meals three times per day.
- Walk in the hall 3 to 4 times per day.

will help the patient sit up in a chair and eat breakfast. This is a huge step to recovery. It is very common to not have an appetite after surgery. This can be due to the anesthesia and medications administered after surgery. It is important to eat something in order to keep strength up and replace those nutrients that have been lost during surgery.

After eating the first meal the nurse will want the patient to walk. Walking is not something that the patient will feel like doing. Getting up and walking is vital to recovery. Walking will cause: patients to breathe deeply, an increase in circulation, a decrease in swelling in the legs and help the patient begin to cough up and spit out the excess mucus caused by the surgery.

Often, the patient may have pacemaker wires that can be seen at the lower end of the chest incision. Pacemaker wires are tiny wires that are temporarily placed during surgery that help regulate the heart rhythm during and after surgery. These wires are usually removed before being discharged from the hospital. Occasionally, the wires are cut flush with the skin.

PROGRESS AND ACTIVITY AFTER SURGERY

Recovery in the hospital after surgery may include:

- Bandages: There may be bandages on the patient's arms or legs and on the chest. After 24 hours, the surgeon may decide to either remove the bandages to allow the incisions to be open to air or keep them covered.
  - Ace Bandages will be wrapped around the legs. When the wraps are removed, elastic support stockings may be given to wear to help with swelling.
  - Sequential compression stockings (SCDs) are additional inflatable stockings that are easily applied and removed (Velcro) to the legs below the knee. SCDs help prevent blood stagnation and potential clots from forming in the legs by sequentially inflating and deflating. These stockings should ideally remain on the legs when the patient is not walking. To avoid tripping and falling, the cables leading to the pump need to be disconnected before getting up and walking
  - Arm Dressings will be used if the arm (radial) arteries were used for a bypass graft.
- Deep Breathing Exercises: Effective breathing after surgery is very important to help prevent pneumonia and other major complications.
  - A special support pillow

tolerated very well by the body. People with tissue valves may only have to take a blood thinner for a short time or possibly not at all. Whether or not a blood thinner is prescribed will be up to the doctor.

PREPARING FOR HEART SURGERY

Before Surgery

Knowing what to expect before going in for surgery can make a big difference in the recovery. It is important to get mentally and physically prepared. The surgery can either be pre-scheduled, which is not performed on the same day as the doctor or hospital visit, or performed while the patient is in the emergency room or admitted to the hospital.

Pre-Admission Testing

If surgery is pre-scheduled, many pre-surgery screenings and tests will be performed at the hospital prior to the surgery. Once the date and time of the surgery is scheduled, a nurse from Pre-Admission Testing (PAT) will call to perform a phone interview and set up a date and time to complete the routine pre-surgery testing at the hospital. This will be scheduled within 14 days of the scheduled surgery date.

On the day of pre-surgery testing

IMPORTANT: Please bring a complete and updated list of current medications to the hospital.

IMPORTANT: If you have a permanent pacemaker or defibrillator, please bring your card or information with you.

IMPORTANT: Let your doctor and staff know if you have sleep apnea and have equipment at home.

Routine testing prior to surgery include:

- Labs (Blood work)
- EKG (Electrocardiogram)
- Chest x-ray
- ECHO (Echocardiogram)
- Carotid Doppler studies
- Heart and Vascular testing
- Incentive Spirometer education and testing
- 5 Meter walk test, if appropriate
- Pulmonary Function Test

Education will include:

- Medications review
- Preparing for surgery
  - Skin cleansing
  - No food or drink after midnight
- Smoking cessation
- Incentive Spirometry (breathing exercises)
- Importance of ambulation (walking) after surgery
- Video/EMMI Education

During this visit an educational video/movie will be shown explaining what to expect before, during, and after surgery. The Anesthesiologist and cardiac surgery staff member will also visit during this appointment. Please expect to be at the hospital

for approximately 4-6 hours to complete all of the tests. The pre-admission testing nurse will discuss the preparation phase of surgery and a brief summary of what can be expected on the day of surgery. We encourage you to bring a family member or friend to join you during this informational process.

Preparing for surgery as an Outpatient

- Certain medications may need to be stopped prior to surgery. The doctor or PAT nurse will discuss what medications should be stopped before surgery. Aspirin is usually continued up to surgery but other more potent blood thinners (warfarin or coumadin, pradaxa, xarelto, plavix or clopidogrel , brillinta, effient, eliquis, etc.) are to be stopped at least 3-5 days before surgery, or longer depending on the condition. If the above-mentioned drugs or any other blood thinner are being taken, let the doctor and the staff know.
- Please stop smoking. Ask the doctor or nurse for assistance if help is needed in quitting.
- Hibiclens will be given to wash the chest and legs for four (4) consecutive nights before surgery and the morning of surgery (see below for specific instructions).
- Do not eat or drink anything after midnight the night before surgery. If medications (as approved by the doctor) must be taken on the morning of surgery, take them with a sip of water.
- Do not wear makeup. Remove all nail polish and do not apply perfume or after shave lotion.
- The morning of surgery, brush your teeth and use mouthwash, but do not swallow.
- Please leave all jewelry and valuables at home.

IMPORTANT: Do not shave any body hair at home as this may increase the risk of wound infection. The body hair will be clipped (not shaved) in the hospital on the day of surgery.

Skin Cleansing Before Surgery

Use the skin prep to shower for four (4) consecutive nights prior to surgery and the morning of surgery. This prep is a special skin cleanser that will be given to the patient to use. Use regular shampoo to wash hair, and follow the instructions given by your doctor for prep.

Remember to shower with the special skin cleaner a fifth time the morning of surgery.

Call Pre-Admission Testing at 810-342-2193 with questions regarding the day before or the day of surgery.

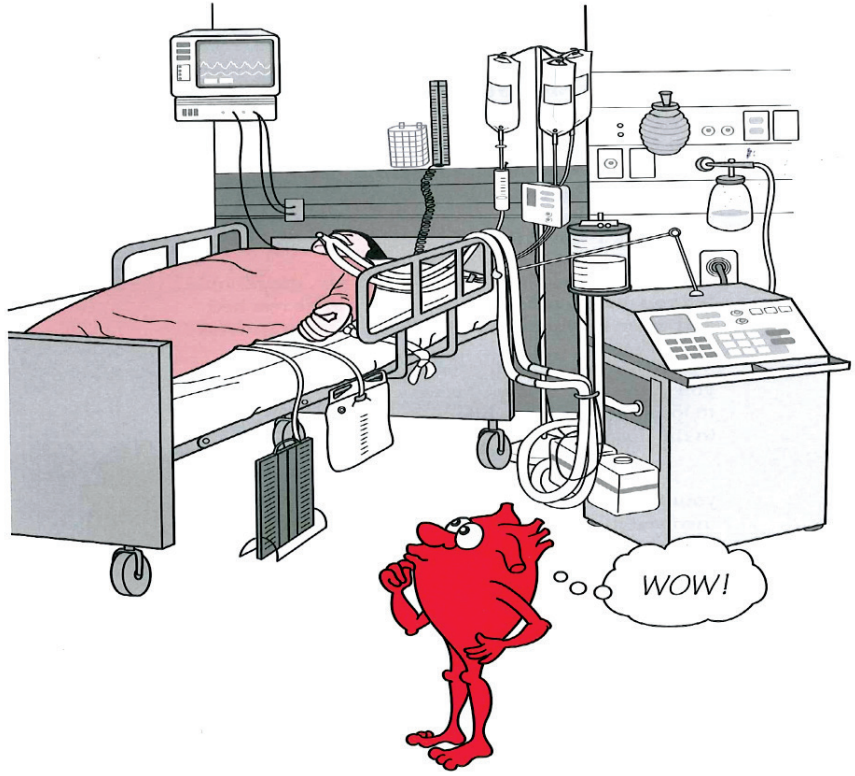
Inpatient Preparation

If surgery is scheduled while already admitted to the hospital, screening and testing will be completed prior

has been able to complete an initial assessment. At first, the nurse will limit the number of people allowed to visit. At first family members will be only be allowed to visit for 3-5 minutes at a time to make sure the patient is getting enough rest.

Once the patient is awake and the anesthesia has worn off, the patient will be able to sit up in a chair and begin the recovery process. As mentioned above it is also important to remember that chest tubes will still be in place. These tubes are in place to drain any excess fluid or blood from around the heart and lungs. Once the chest tubes have completed draining, a member of the cardiac surgery team will remove them. When they are removed the patient may have stitches in place which will be removed at a later date, possibly by the home care nurse after the patient is discharged from the hospital.

The average stay in the hospital after surgery is 5-7 days. This again, is dependent on how well the recovery is going and how healthy the patient was before surgery. The day after surgery is considered to be day number one. On day one, the nurses



"Going for Heart Surgery" Pritchett & Hull Associates

- The breastbone is repaired with stainless-steel wires and the outer layer of the skin sewn shut. The wires usually stay in for life even after bone healing.

WAKING UP AFTER SURGERY

How Will You Look?

Many patients appear pale and puffy and feel cool after surgery, this is natural. The puffiness is only temporary. Most patients will experience a "water weight" gain during surgery. Many patients will be intentionally kept under anesthesia for 4-6 hours after surgery. Patients may open their eyes when spoken to but may not remember being visited. Some patients may become confused when they wake up. If this occurs, the nurse reassures them that their family is here, the surgery is over and everything is okay.

How Will You Feel?

Many patients feel pain from the chest and leg incisions. If the radial artery was used during the surgery, the patient will feel pain at the arm incision. Pain medication is available and should keep the patient relatively comfortable. If in pain, do not hesitate to ask for pain medication. Most patients feel weak and tired but all of these feelings will get better with each passing day. Some people may feel restricted with all of their equipment, IV tubing, monitoring cables and chest drains. As the days go by those lines and tubes will be removed and it will be easier to move around.

It is important to remember everyone responds to anesthesia differently. When waking up from surgery, the patient can expect to feel groggy and disoriented. As described above, once the surgery is complete, the patient will wake up on the sixth floor of the hospital in the CCU. The nurses on this floor are specifically trained to take care of cardiac surgery patients. A specialty nurse will be sitting by the bedside until the patient wakes up. Upon waking, the patient may feel as though they cannot move their arms or legs. This is normal and will begin to go away when the anesthesia wears off.

The breathing tube will still be in place so the patient will not be able to talk until the tube is removed. Removing the tube is a gradual process that can take anywhere from 2-8 hours. This is only an average and will be based on the lung function before surgery and how well recovery is after surgery. Remember, this tube was breathing for the patient during surgery. The lungs will begin to breathe on their own once out of surgery. After the lungs take over completely the doctor will remove the breathing tube and the patient will be placed on oxygen using a nasal cannula.

Family members will be allowed to see the patient once the nurse

to surgery. These tests are crucial for the doctor(s) to determine if the heart is ready and strong enough to have surgery.

Some of the screens and tests that will be performed are:

- Blood tests (Labs)
- Chest x-rays
- Urine sample
- EKG
- History and physical exam
- Ultrasound
- Signing consent forms for surgery, possible blood transfusions, and admission to the hospital.
- Anesthesia review

A Cardiac Rehab specialist will also educate on what to expect before, during and after surgery. The specialist will also teach the patient how to deep breathe and cough using an Incentive Spirometer (IS). See directions below.

HOW TO USE AN INCENTIVE SPIROMETER

1. Sit on the edge of your bed if possible, or sit up as far as you can in bed.
2. Hold the incentive spirometer in an upright position.
3. Place the mouthpiece in your mouth and seal your lips tightly around it.
4. Breathe in slowly and as deeply as possible. Notice the blue piston rising toward the top of the column. It should reach the blue indicator.
5. Hold your breath as long as possible. Then exhale slowly and allow the piston to fall to the bottom of the column.
6. Rest for a few seconds and repeat steps one to five at least 10 times every hour.
7. Position the blue indicator on the left side of the spirometer to show your best effort. Use the indicator as a goal to work toward during each slow deep breath.
8. After each set of 10 deep breaths, cough to be sure your lungs are clear. If you have an incision, support your incision when coughing by placing a pillow firmly against it or by holding your heart-hugger.
9. Once you are able to get out of bed safely, take frequent walks and practice the cough.

THE DAY OF SURGERY

If the surgery is pre-schedule, on the day of surgery, please report to the Surgical Services Check- In area located on 3 Central at the time the PAT nurse instructed you to arrive. A surgical liaison (nurse) will be available to answer questions and keep any family members informed throughout the surgery. Family members are given a pager so they can be reached at any time by the surgical liaison. Once the surgery is completed, in approximately 4-6 hours, the patient will be transferred directly to the Coronary Care Unit

(CCU) on the sixth floor. Family members will be directed to the CCU waiting area.

Please have all family members at the hospital one hour prior to surgery. It is very important for family members to visit a loved one before they go into the operating room. This time is scheduled between 7:15 a.m. and 7:30 a.m. for an 8 a.m. starting time.

PRE-OP HOLDING

There are two areas in which the patient may be prepared for surgery: pre-op holding or inside the operating room. During this time, if not already completed, consent forms that give permission to proceed with the surgery will be signed. An intravenous (IV) catheter will be inserted to help with sedation and putting the patient to sleep. Another catheter will be inserted in one of the arteries (usually in the wrist) in order to have a continuous blood pressure recording throughout the surgical process. A local anesthetic will be injected into the skin on the neck to numb the area so that a long catheter can be inserted there. This is called a Swan-Ganz catheter and is used during and after surgery to give medicine. This catheter also measures the amount of blood the heart is pumping.

After the doctor is finished inserting the IV's and the Swan-Ganz catheter, the patient will be taken into the operating room where they will be put to sleep via an oxygen mask placed over the mouth and nose. The anesthesia will be inserted via the IV line that was inserted in pre-op holding. This medication may sting or burn a little but that's normal. Once the patient is sleeping, an endotracheal (breathing) tube will be inserted. The kidneys will also be monitored for proper functioning during the surgery; thus a catheter will be inserted in the bladder to measure how much urine output occurs during surgery.

HOW THE USUAL BYPASS OPERATION WILL GO

- The surgeon will start with a cut along the breastbone and then the breastbone is carefully separated.
- The thin layer of tissue that surrounds the heart is opened and folded back.
- Veins and arteries that will be used as the bypass grafts are removed from either the leg, chest and/or arm. Often, an artery from the chest (mammary artery) is used as a graft
- To do the operation, the surgeon may need to temporarily stop the heart. In order to stop the heart, the patient may be connected to a heart-lung machine, which will keep oxygen-rich blood flowing through the body. This is called on-pump or arrested- heart surgery. If the surgeon chooses not to use the heart-lung machine, it's called off-pump or beating-heart surgery.
- When everything is ready, the surgeon will attach the bypass grafts.
- One end of the graft is sewn to the aorta (except for the mammary artery that remains attached to the arm artery) and the other end is sewn past the blockage on the coronary arteries, allowing the blood to flow around the block.
- If the surgery was done on-pump, once the bypass(s) are completed, the heart-lung machine will be disconnected causing the heart to start to pump on its own again.
- Small tubes will be placed in the chest to drain any extra fluid after surgery.
- Pacing wires may be placed alongside the heart to help it beat normally during hospital recovery.