

After the heart is attached, surgeons then connect the blood vessels, allowing blood to flow through the heart and lungs. As the heart warms up, it begins beating. Surgeons check all the connected blood vessels and heart chambers for leaks before removing you from the heart-lung machine. Then the clamp on the main blood vessel leaving your heart (aorta) is removed, which causes your heart to start beating normally. If it starts beating abnormally (fibrillating), your heart is given an electrical shock to correct the rhythm. The clamps are removed from your other blood vessels, allowing blood to flow normally to your new heart. The heart-lung machine is turned off, leaving your new heart to work by itself.

Your breastbone is fastened together using heavy steel wire. Your chest incision is closed with stitches. Chest tubes will be placed to collect the fluid as a result of surgery.

Family Visitation During Surgery

During the transplant surgery, your family will be taken to the surgery waiting area and the operating room staff will be in touch with your family to give them an update on your condition. Once the operation is over, the surgeon will meet with your family to tell them about your procedure. After surgery you are taken to the intensive care unit where you will be watched very closely. No sick or ill feeling family members should visit you while in the hospital.

Visitors may be limited right after surgery. But, as you start to feel better, you can look forward to having company. Immediate family and/or significant others are welcome to see you after your surgery, however, there are no more than two visitors at a time. Visitation may be further limited due to tests, procedures, nursing cares, or the promotion of rest needed for your recovery.

After Surgery Care

Following surgery, you will wake up in the intensive care unit. Anesthetics wear off at different rates, so it is hard to say when you will wake up. It is not unusual for your mind and body to be uncoordinated at first. For example, at first some people can hear and open their eyes before they can move their arms or legs. Do not be alarmed, in a short time your body and mind will be back on track. You will be watched closely by the doctors and nurses who have been trained to recognize any problems you may have with your new heart.

What to Expect in the Intensive Care Unit

Endotracheal tube and ventilator: A breathing tube (endotracheal tube) will be placed prior to surgery and you will continue to have it in the ICU. The tube goes in your mouth, by your vocal chords and into your windpipe. It may feel uncomfortable and will keep you from talking. For the first 24 to 48 hours you will be on a breathing machine until the effects of anesthesia wear off and you start to breathe well on your own. During this time you will be asked to communicate with your nurse and family by nodding your head and/or writing messages on a tablet. The breathing tube will be removed when you no longer need help breathing.

Central line: A central line is a large IV that is usually placed in a vein in your neck. This lets the doctors give you medicine or blood products as needed during and after your surgery.

Pulmonary artery catheter and monitor: A pulmonary artery catheter is a thin tube that is placed through the central line. The tube is then guided through your heart into blood vessels connected to the lung and on the other end is hooked to a monitor. The monitor shows numbers that tell medical staff how your heart is doing.

Heart monitor (telemetry): Sticky pads are placed on different parts of your body. Each pad has a wire that is hooked to a TV type screen. This allows medical staff to see a tracing of the electrical activity of your heart. They will watch the tracing closely for any abnormal heart beats. The heart monitor helps them make sure that all is going well.

Arterial line: This line is placed into an artery (blood vessel), usually in the wrist or the groin. The small catheter is used for measuring your blood pressure or for taking blood.

Foley catheter: This is a tube that will be put into your bladder to drain your urine. The catheter may make you feel like you have to urinate. Relax, as the catheter will drain the urine for you. It is very important to monitor your urine output to make sure your kidneys are working as they should. The doctors will remove this tube 24 to 48 hours after surgery. When the catheter is taken out, you can urinate on your own. Important things to remember:

- Don't pull on the catheter because this will make you hurt or bleed
- Don't kink the catheter because the urine cannot drain
- Don't lift the bag of urine above the catheter. If you do this, the urine will flow back into your bladder which can cause an infection

Pacemaker wires: Your new heart may need help beating at a normal rate after surgery. You will have two pacemaker wires below the chest incision coming through the skin. They may be covered with plastic to protect them or they may be attached to a temporary pacemaker if your new heart needs the help. These wires will be removed before you are discharged from the hospital.

Chest tubes: Chest tubes remove air, blood or fluid from around your lungs and heart. The chest tubes are attached to a container and may be hooked to suction. This lets your lungs fill back up with air when you breathe. You will have two to three tubes coming out of your chest that will be draining fluids from the surgery. Once the fluid that is collected in the container decreases or stops, the doctors will have the tubes removed.

Wrist restraints: These are soft cloth bands used to restrain your wrists to the sides of your bed. This is necessary to keep you from pulling out your tubes and IVs. Medical staff will check on you often to make sure you are safe and all your needs are met while you are restrained. Restraints should only be used for a short time. They will be taken off when there is less chance that you will pull your tubes out.

Leg stockings: Stockings called “edema wear” and/or leg covers that inflate and deflate called “sequential compression devices” will be placed on your legs while you are in bed. They prevent swelling and blood clots. Moving your legs and feet are also important ways to prevent clots.

Pulse oximeter: This is a machine that tells how much oxygen is in your blood. A cord with a clip or sticky strip is placed on your ear, finger or toe. The other end of the cord is hooked to a machine. Medical staff use this machine to see if you need more oxygen.

Surgical dressing: You will have a bandage over the chest incision for the first 48 hours. If there is no drainage, the bandage will be removed by floor staff. You may have sutures on your incision. These wounds need about six to eight weeks to heal completely. You must avoid lifting heavy objects during this time. The wound color will slowly change from purple to red to pink, returning to normal after several months. It is normal for the area around your incision to be numb after surgery. This should go away in less than a year.

Tell your doctor or caregivers if you have pain over the incision in your chest; if your stitches come apart or are red, swollen or have pus coming from them; or your bandage becomes soaked with blood.

Blood draws: You will have blood drawn each day while in the hospital in order to adjust the dosages of the antirejection medications and to monitor kidney, liver and other organ functions after transplant.

Blood gases: This test is also called an “ABG.” Blood is taken from an arterial line in your wrist or groin. Your blood is tested for the amount of oxygen, acids and carbon dioxide in your blood. ABGs may be done if you are having trouble breathing or other problems caused by your illness.

Chest X-ray: You will have a daily chest X-ray which is a picture of your heart and lungs. Doctors use this to see how your lungs and heart are doing after surgery. It may also be used to look for signs of an infection like pneumonia.

Pain control: You will have some discomfort where the incision was made to reach your heart. The nurse will ask you about your pain and to rate it on a regular basis. If you have pain and are uncomfortable don’t be afraid to ask for pain medication. Reducing your pain will allow your body to move more easily and help you recover faster. Most patients complain of soreness but don’t have severe pain. The soreness comes from the surgical incisions and muscle spasms. Often good posture and moving your arms and shoulders will help this. If you have severe pain, the nurse will give you medicine. Severe pain seldom lasts more than three days. Pain medicine may upset your stomach and make you feel like vomiting. Because of this, pain medicine and anti-nausea medicine are often given at the same time. Pain medication may also cause constipation.

Day/night confusion: You may not know when it is daytime or nighttime when you stay in the ICU. The lights are on all the time, which may cause you confusion. Some of the medicines you are given may also affect your mental state. As you recover and the medications you are receiving stabilizes your normal patterns of sleep and wakefulness and thought processes will return. You will also become more aware of time when you are moved to a room on a regular floor.

Cough and deep breathing: The nurses and therapists will teach you how to use a hand-held breathing exercise machine (incentive spirometer) to help prevent lung problems. Coughing helps to bring up sputum (mucus) from your lungs. You should breathe deep and cough every hour while you are awake even if you wake up during the night. Hold a pillow against your chest when you cough to help lessen the pain. Take a deep breath and hold it as long as you can. Then push the air out of your lungs with a deep, strong cough. Put any sputum that you have coughed up into a tissue. Take 10 deep breaths in a row every hour while awake. You should also use your incentive spirometer every hour while awake.

Visitors: It is encouraged to have no more than two visitors in the room at a time (although exceptions can be made) to decrease any interruption in care. One family member is allowed to spend the night. We also encourage the family member to leave and get rest – it's easy to forget to take care of themselves.

Hospital Course and Stay

The normal hospital stay after transplant averages about 10 to 14 days. If you have any complications you may need to stay in the hospital longer which could be weeks to a month or more. Most patients stay in the ICU for two to three days, although this varies depending on the pace of your recovery. The rest of your stay will be on the cardiac floor. Your family is encouraged to spend as much time as possible at your bedside in the Cardiac Progressive Care Unit. Below is a list of other things you can expect while you are in the hospital, recovering from surgery.

Eating and drinking: You may be able to eat when bowel sounds (stomach growling) are heard. Ice chips are usually given first and then liquids (water, broth, apple juice or lemon lime soda). If you don't have problems after drinking liquids, medical staff may then let you eat soft foods. Some examples of soft foods are ice cream, applesauce or custard. If you do okay with soft food, you may start eating a regular diet.

Activity: Activity helps prevent complications and speeds your recovery. The goal is to get you out of bed and into a chair, a day or two after surgery with the help of a nurse. Your nurse will tell you when it is okay to get out of bed on your own. You must call your nurse before getting up until they tell you it is okay to be up on your own.

During your hospital stay you will work with a team of people to build up your strength and stamina including physical and occupational therapists and cardiac rehab. Once you have the strength, you will take short walks in the hall with a cardiac rehab nurse. Eventually you can climb stairs and take brisk, longer walks to get ready for going home. If you ever feel weak or dizzy, sit down right away and tell your nurse. Before going home, your team will tell you about the safest and most effective ways to increase your activity after your hospital discharge.

Denervation and its effects on activity

When your new heart was put in your chest, the nerves that help regulate heart rate based on activity could not be connected to it. You will be instructed to have a warm-up period before any exercise as well as a cool-down period so your heart rate can slowly return to normal. You may also experience a slight light-headed feeling when you make abrupt changes in position. Most heart transplant recipients achieve

near normal function despite denervation; are able to exercise normally; and some have eventually become capable of athletic achievements. Additionally, partial to complete reinnervation – the process of your body restoring the nervous system control of your new heart – happens for many transplant recipients after months to years post-transplant.

Hygiene: Right after surgery you will be given sponge baths. As your condition and strength improves and your lines are removed you will be allowed to have a shower and shampoo your hair.

Bowel movement: It is common to be constipated, or have troubles having a bowel movement, following surgery due to the medicines you are given and decreased activity. To help with this you will be given stool softeners to make your bowel movement softer so you do not need to strain.

Handwashing: Everyone who enters your room will need to wash their hands or use the hand sanitizer. This protects you from potential infections due to lowered immunity from taking antirejection medications.

Education: In order to be successful at home, it is important for you and your caregiver to learn how to care for your new heart. You will be given a transplant education binder after surgery which both you and your caregiver will be required to read. You will have daily education sessions with the transplant coordinator and pharmacist and your caregiver is expected to be there during the sessions. These sessions may happen anytime Monday through Friday, from 8 a.m. to 4 p.m. Before going home you will complete quizzes showing you have read the education and are ready to care for your new heart.

Mask: You will be required to wear a mask when you leave your room while in the hospital. We recommend that you wear a mask when coming back to the hospital for appointments and testing for the first three months after transplant.

Daily weights: You will be weighed each day. Medical personnel compare your weight from day-to-day to help them see how much body fluid you have. When you lose too much body fluid you can become dehydrated. If you have too much body fluid, you may have trouble breathing and get swollen ankles. Your body does not work well when it has too much or too little fluid. Diuretics may be given to make you urinate more often and help get rid of extra fluid you may have collected.

Intake/output: Nurses need to know the amount of liquid you are getting. They also need to know how much you are urinating. Nurses often call this “I & O.” You need to tell your nurse how much fluid you drink. Do not flush your urine down the toilet before it is measured and reported to your nurse.

Visitors: Once on the Cardiac Progressive Care Unit, the number of visitors is not limited. Family members are encouraged to be at bedside and available when doctors are rounding to ask questions and be available to provide you support while in the hospital. One family member is allowed to stay the night. For out of town visitors wanting to stay nearby but not in the room, we have accommodations available on campus as well as nearby hotels at discounted rates. The social worker can give you more information on any of these options.

From Hospital to Home

During your hospital stay, your doctor and transplant team will work with you on a plan to get you back to home. Have confidence that your doctor won't let you leave the hospital until you are ready. Depending on your recovery and strength, your doctor will either recommend you go to a rehab facility for a period of time before going home, or home with home health care. You will discuss your rehab and home health care options with Social Work and this will be arranged before discharge.

Home health care: If you are discharged straight to home, you are required to have home health care right away. Home health care nurses will make sure you are set up to take care of your heart at home, perform weekly lab draws, provide ongoing education and assess you to make sure you continue to recover from surgery without problems. If you go to a rehab facility before home, you will have home health care when you leave rehab. Most times home health care will see patients until they start cardiac rehab which is about six weeks after surgery.

Cardiac rehab: Once cleared by the surgeon, you will be able to start cardiac rehab. A referral should be made to your local cardiac rehab before you leave the hospital. It is expected that you complete all cardiac rehab sessions which is usually three times a week for 6 to 12 weeks.

Lab draws: You will have labs drawn on a regular basis after transplant to check medication levels, blood counts, electrolytes and your kidney function. The labs must be drawn in the beginning of the week to allow time for your team to get the results and must be timed according to when you take your meds. After transplant, you will need labs checked at least once a week. Depending on how you are doing, the further out from transplant, the less frequent you will need labs.

Medications: Before you leave the hospital, all of your transplant medications will be brought to your hospital room and the transplant pharmacist will help you with filling a weekly pillbox to make sure you have all of your medications ready to go home. You will be able to pick up refills of your medications at your preferred pharmacy.

Post-transplant follow-up care: In order to be successful after transplant, it is important that you come to all of your follow-up appointments and tests at Nebraska Medical Center. Your next years' worth of heart transplant follow up will be scheduled before you leave the hospital to allow for adequate time for you to make arrangements to be there. In general, below is a list of heart transplant follow up and timeframes. You may be in the hospital during some of the timeframes so those tests will be done while you are still here.