



Lung Volume Reduction Surgery

For the treatment of emphysema

Lung volume reduction surgery (LVRS) is done to remove parts of the lung that have been damaged by emphysema. This handout describes the process of being considered for LVRS at University of Washington Medical Center (UWMC).

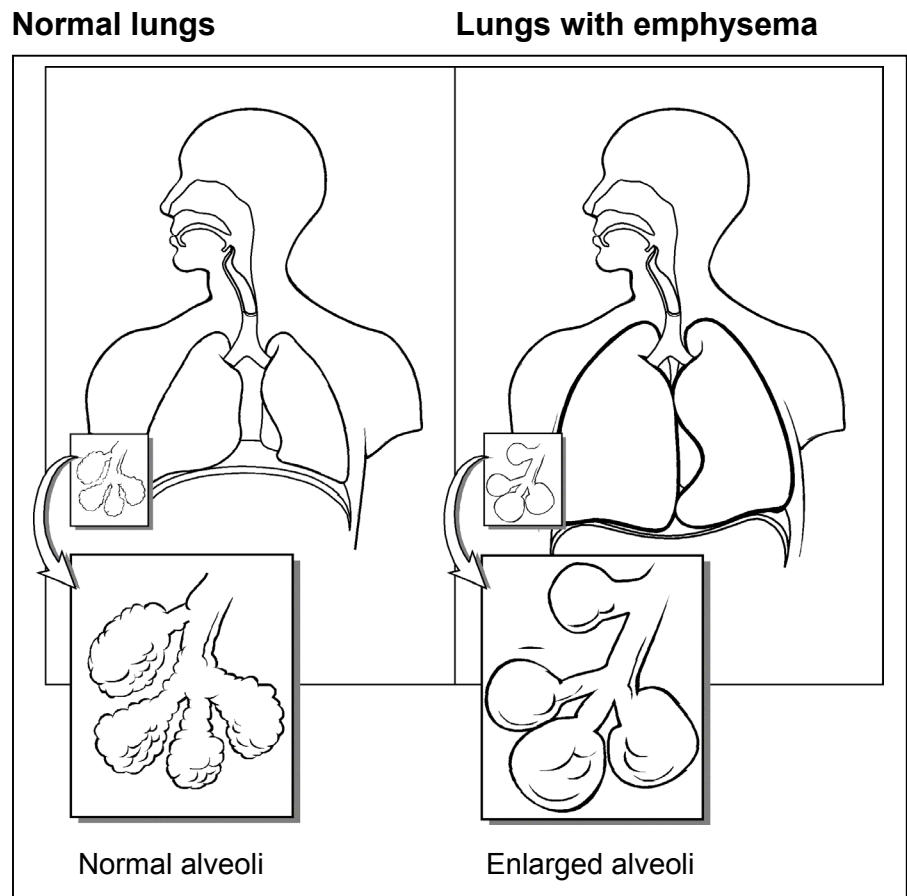
What is emphysema?

Emphysema is one of a group of diseases known as chronic obstructive pulmonary disease (COPD). COPD results in blocked airflow in the lungs. Healthy lungs inflate and deflate like a balloon.

With emphysema, the lungs lose their elasticity and become stretched out. As the lungs become stretched, air is trapped in the small air sacs known as alveoli. The trapped air makes it hard for the lungs to exchange oxygen and carbon dioxide. This impaired gas exchange results in shortness of breath, or dyspnea. Overstretched lungs take up too much room in the chest cavity and decrease the effectiveness of the diaphragm (the muscle that controls breathing).

The most common cause of emphysema is cigarette smoking. There is no known cure for emphysema, but LVRS may offer relief from the symptoms.

These drawings show how the alveoli respond in normal lungs and in lungs with emphysema.



What is LVRS?

LVRS is an operation to remove the most damaged parts of your lung. The surgeon will decide how much and which part of the lung to remove by looking at your X-rays and perfusion scan (a study that shows the blood flow to each area of the lung). Damaged lung tissue is removed through a cut made in your chest through the breastbone, or sternum. This is called a median sternotomy. It is thought that removing the most damaged parts of your lungs will give the remaining lung tissue room to expand. UWMC was one of 17 centers in the nation participating in the National Emphysema Treatment Trial (NETT). Results from the trial show that LVRS may:

- Reduce your shortness of breath.
- Increase your exercise capacity.
- Improve your quality of life.

LVRS is not a cure for emphysema. There will still be emphysema present in the remaining lung tissue, and we do not know how long the benefits of LVRS will last.

Risks of LVRS *may* include:

- Pneumonia or other infections.
- Prolonged air leak from the lungs or a collapsed lung (pneumothorax).
- Heart attack or irregular heart beats.
- Bleeding requiring a blood transfusion or a return to the operating room.
- Stroke or blood clots.
- Prolonged need for the ventilator (the machine that breathes for you during surgery).
- Problems with the intestines (bowel) such as bleeding or obstruction.
- Long hospital stay.

Based on the NETT results, the mortality rates (risk of dying) after the surgery are:

National

30 days after surgery 4%

90 days after surgery 8%

UWMC

30 days after surgery 2%

90 days after surgery 6%

Screening to Determine Eligibility for LVRs

First contact

Your first contact with staff in the LVRs program will most likely be by phone. Your doctor may have sent us a letter or your records to start the process, or you or a family member may have called to request information. On the phone we will briefly discuss the information in this handout, answer your questions, and ask you about these issues:

- MEDICAL HISTORY** – diseases you have now or were treated for in the past (such as cancer), and the times you may have been in the hospital.
- SURGICAL HISTORY** – any operations you have had, especially on your chest.
- SMOKING** – if you smoke cigarettes, cigars or pipes, or when you quit. On average how many packs did you smoke per day, and for how many years? Are you currently using any products to help you stop smoking, like nicotine gum or patches? You must be nonsmoking for four months before you can have surgery.
- COUGHING and SPUTUM** – how often do you cough; do you bring up sputum (phlegm) from your lungs; and if so, how much and what does it look like?
- HEIGHT and WEIGHT** – must be measured ***without*** shoes.
- MEDICATIONS** – the name and amount of the drugs you use regularly, and why you take them. We also need to know about any over-the-counter drugs, vitamins and herbal remedies that you take that are not prescribed by your doctor.
- DRUG ALLERGIES**
- OXYGEN** – do you use supplemental oxygen, how much and when?
- ACTIVITY** – do you exercise daily; have you been in a pulmonary rehab program; does your breathing problem get in the way of your daily activities?
- SUPPORT SYSTEM** – your family and close friends. Who will help out if you have surgery?

If you want to move to the next step, we will need your mailing address and contact information for your primary doctor and your lung doctor, if you have one. We will mail you a form, “Authorization to Disclose Protected Health Information” to give to your doctor(s) so that your health records and X-ray films can be sent to us for review.

Baseline screening

We will review your records and films. If you appear to be eligible for LVRS, you may choose to have more tests to further evaluate your eligibility. If you do not live in the Seattle area, some of these tests may be ordered by your primary doctor and done near your home. Some of the tests must be done at UWMC. We will review the results of any tests done elsewhere before scheduling your testing at UWMC. The tests may include:

- Full pulmonary function testing with diffusing capacity (breathing tests).*
- Arterial blood gas measure (blood taken from the artery in your wrist).*
- High resolution and spiral chest computed tomography (CT) scan (a special X-ray of the lungs).*
- Echocardiogram (a picture of the heart taken with an ultrasound device).*
- Dobutamine stress test of the heart (requires injections of a drug called dobutamine, to increase your heart rate, and a radioactive dye used to take pictures with a special camera).
- Bicycle exercise stress test (you will ride a stationary bike until you can't go any longer; during the test you will wear a heart monitor, receive oxygen through a mask, and be observed by a doctor).
- Six-minute walk test.*
- Lung perfusion scan (measures the blood flow to your lungs).
- Cotinine blood level (a lab test to confirm that you do not smoke).

(This test may be done near your home if testing facilities are available.)*

If you have had any of these tests in the six months prior to starting baseline screening, they may not have to be done again.

After the tests, you will be scheduled to meet with:

- **A UWMC pulmonologist:** a lung specialist who will review your history, test results, and current treatments. If you see a lung specialist regularly, we may not need to schedule this visit.
- **A thoracic surgeon:** the doctor who will perform your surgery.
- **A rehab medicine physician:** the doctor who will evaluate your activity level and write the prescription for your pulmonary rehab program if needed.

Some pulmonary rehab class topics are:

- **COPD and Emphysema**
- **Medications**
- **Oxygen Use and Equipment**
- **Breathing Retraining**
- **Secretion Clearance and Management**
- **Exercise**
- **Nutrition**
- **Energy Conservation**
- **Stress Management, Depression, and Relaxation Techniques**
- **Travel and the Environment**
- **Managing Your Health and Healthcare**

What's next?

if the heart tests show that you may have either high blood pressure in your lungs, or coronary artery disease (CAD), which is narrowing or blockage of the blood vessels to the heart, you may also need to meet with a cardiologist (heart doctor), and/or undergo a heart study called a heart catheterization.

Pulmonary Rehabilitation

After you are done with all of the required tests, and if you are found to be a candidate for LVRS, you will complete pulmonary rehabilitation or “rehab.” Pulmonary rehab is a program of exercise sessions and classes supervised by medical staff, which may include nurses, physical therapists, exercise physiologists and/or respiratory therapists. The goal of rehab is to maximize your physical condition and breathing prior to surgery so that your recovery will go more smoothly. You will complete two to three sessions per week and at least 16 sessions of exercise.

Exercise sessions

During the exercise sessions, you may use stationary bicycles, treadmills, handheld weights or other exercise equipment. You will learn how to use the equipment, and about proper body mechanics and breathing techniques. Your blood pressure, heart rate, and blood oxygen level will be measured before, during, and after exercise. You will set goals with the help of the rehab staff to gradually increase your endurance. You will also be given exercises to do at home on the days you do not attend classes.

Classes

The classes are taught by the rehab staff and other hospital staff, such as pharmacists, dietitians and psychologists. Topics that may be covered are listed to the left.

UWMC has a pulmonary rehab program on site. For patients outside the Seattle area, we have a list of the programs in Washington, Oregon, Idaho, Montana, Wyoming, and Alaska. We can help you find a site that will work for you.

The Surgery

Pre-operative visits

We will schedule your return to UWMC for surgery at the completion of your rehab program. Before surgery, you may repeat the exercise test, the six-minute walk test, and the breathing tests. You will meet with the surgery team for a pre-operative exam. At this time, you will discuss and sign the surgical consent form. You will also meet with the anesthesiologist. You will have an electrocardiogram (EKG) and have blood drawn to check your electrolytes and blood counts, and to type and screen your blood in case you need a blood transfusion during or after surgery. You will be given information about when to stop eating and drinking before the surgery, and which medications to take or not take.

The day of the surgery

You will be admitted to the hospital on the day of surgery. In the pre-operative area, you will have intravenous (IV) lines placed in your veins to deliver fluids and medications, and monitor your vital signs. You will also have a catheter (tube) placed to drain urine from your bladder. You will be given medication to help you relax. In the operating room, the anesthesiologist will put you to sleep, place a tube down your throat into your airway to assist with breathing, and monitor your vital signs such as blood pressure, heart rate and rhythm, and laboratory values. The surgery takes about one to two hours.

When the surgery is over

Right after the surgery, the breathing tube will be removed, and you will be taken to the recovery room where you will wake up. When you are stable, you will be moved to the intensive care unit (ICU) for continued monitoring.

Protecting your incision

You will be taught to use “sternal precautions.” These are measures you will use to protect your incision. After surgery, your breastbone will be put back together with wires that will remain in your chest. The breastbone will be unstable for several weeks after surgery, until the two pieces of bone fuse together again. Avoid motions that cause the incision to stretch or pull. You will be told to:

- Hug a pillow to your chest when you cough. This is called splinting and will help decrease discomfort.
- Not lift items heavier than **five pounds**.
- Use your legs instead of your arms when moving in bed or standing from a chair.

After surgery, you will have:

- **IV lines – small tubes in your arm and neck to give you fluid and medicine and monitor your vital signs.**
- **An epidural catheter – a small tube placed in your back that is used to give you pain medicine.**
- **A telemetry monitor – several sticky patches on your chest attached to wires that are used to monitor your heart rate and rhythm.**
- **A Foley catheter – a tube in your bladder to drain urine.**
- **Four chest tubes – drains that come out of your chest and are hooked to a suction machine to remove old blood and keep the lungs inflated until they heal.**
- **An oxygen mask to supply extra oxygen.**
- **Sequential compression devices (SCD) – inflatable stockings worn on your legs that squeeze intermittently to prevent clots from forming.**

What to expect during your hospital stay

Your nurse or respiratory therapist will teach you about “pulmonary toilet,” or how to clear secretions from your lungs to prevent pneumonia. You will stay in the ICU until the surgeon feels you are ready to transfer to a private room in the cardiothoracic surgery unit. Most patients spend one night in the ICU. After surgery you will resume eating, starting with liquids, and adding solid foods as tolerated. You may have an upset stomach (nausea), due to the anesthesia and other medications. You will be given medications to help control the nausea. It may take several days for your bowels to work normally after surgery.

You will start exercising as soon as possible after surgery. Your first activity will be to sit on the side of the bed for a few minutes. The next step will be to move from the bed to a chair. You will try to stay up for longer periods each time you get up. A physical therapist will help you walk when you are able, and will show you exercises that you can do in your room.

The dressing on your incision will be removed after two days and left open to the air. The catheter will be removed from your bladder when you are able to get up to the bathroom. The IVs will be removed when you no longer need them for fluids or medications. The epidural catheter will be removed when you can take pain medications by mouth. The suction will gradually be removed from the chest tubes, but they will remain in your chest until there is no longer air leaking from your lungs. The tubes may be removed one at a time or all at once. The usual hospital stay after LVRS is 7 to 14 days.

After you are discharged from the hospital

Sometimes patients are well enough to leave the hospital, but still require help with their care. When this happens, you may have a short stay in a rehabilitation facility or nursing home.

If you are discharged to home, you will need someone to be there to help you. Your nurse will go over your discharge orders with you before you leave. This will include information about your medications, oxygen, any special equipment, pain control, activity limits and a follow-up visit with your surgeon. Your surgeon will want to see you in the clinic one to two weeks after you leave the hospital. Your care may be transferred to your local primary doctor if the surgeon feels you are progressing well.

Questions?

Call:
Peg 206-598-6252 or
Diane 206-598-3724

Your questions are important. Call your doctor or health care provider if you have questions or concerns. UWMC Clinic staff are also available to help at any time.

LVRS Services
206-598-6252 or
206-598-3724

You will not be allowed to drive for six to eight weeks from the date of surgery. The first reason is that you may still be using narcotic pain relievers, which may cause drowsiness. The second reason is that the arm motions you use to drive a car put too much pressure on your incision. Even a low-speed car accident could propel your chest into the steering wheel or airbag and damage your incision.

You will return to pulmonary rehab for exercise sessions after your surgery to help maintain your conditioning. The staff will help you do exercises that are safe while your incision heals.

UNIVERSITY OF WASHINGTON
MEDICAL CENTER
UW Medicine

LVRS Services

Box 356170

1959 N.E. Pacific St. Seattle, WA 98195
206-598-6252 or 206-598-3724