

Patient information for lung resection

Full name of procedure:

Thoracotomy, exploration of the thorax, resection of lung, lobectomy, pneumonectomy, wedge resection of lung, segmentectomy of lung.

Short name:

Lung resection

Reason for procedure:

The commoner reasons for performing the procedure are:

- Cure lung cancer – it is possible to cure early lung cancer by cutting out the affected lobe of the lung
- Cure benign (non-cancerous) conditions of the lung, e.g. carcinoid
- Remove destroyed or scarred lung

We use our two lungs to breath in oxygen and breath out carbon dioxide. We need our lungs to live. However, it is possible to survive and perform most basic activities with the equivalent of about one lung. If the lungs have not been badly damaged by cigarette smoke it is possible to remove a whole lung (pneumonectomy). A more usual operation for early lung cancer is a lobectomy. There are three lobes in the right lung and two in the left. So a lobectomy removes around half a lung.

Most people do miss the part of the lung that is cut out. They tend to be more breathless on climbing stairs or when running for a bus. However, the cancer has often destroyed the lobe of the lung and the effect of removal may not be as severe. The loss of the lung tissue may be compensated by giving up cigarettes.

If the lungs have been badly damaged it may not be possible to remove the lung tumour. Many of the tests you have been through have been testing your ability to survive the surgery.

Description of procedure:

The procedure is performed under general anaesthetic. The lung being operated on is collapsed by the anaesthetist to allow the surgeon access to the lung and the pleural cavity (the body compartment where the lung is located).

An incision, about 9 inches long (20cm) is made around the back and side, under the arm. The ribs are spread apart to allow access to the lung. It may be necessary to cut one rib. If the tumour is invading any ribs, they will be cut out.

The part of the lung being removed is essentially amputated off the heart. This involves dissecting out and tying off major blood vessels from the heart and stapling off the windpipe to the part of the lung being excised.

For most lung resections, two drains (chest tubes) will be placed to allow any air or blood to drain from the chest cavity and to allow the remaining lung to re-expand.

Lobectomy

The standard lung resection for lung cancer is a lobectomy. There are three lobes on the right and two on the left. Therefore in lobectomy, only part of the lung is removed, along with the lymph glands draining the lobe with the tumour in it.

This is major surgery and it is possible to die following this surgery. On average, 3 out of every one hundred people having a lobectomy for lung cancer die of the procedure. This rate is higher if you have had a previous heart attack or angina, or have chronic airways disease or asthma. However, your chances of dying of the cancer are far higher if you do not have the surgery.

Pneumonectomy

When the tumour is central near the root (hilum) of the lung or where it invades more than one lobe, it may be necessary to remove the whole lung. This operation is similar to lobectomy but places more strain on the heart and the other lung. You have to be stronger and fitter to survive this surgery. Eight out of every hundred patients (8%) having this surgery die of the surgery. Many years after the surgery, complications may occur.

Usually no drains are placed after a pneumonectomy as there is no remaining lung which may leak air or blood.

Wedge resection or segmentectomy

Where the tumour is small and near the periphery of the lung it may be possible to remove less than a whole lobe of the lung. While there is a slight increase in the chance of the tumour coming back, the rate of complications is much lower and less fit patients can survive this surgery.

Postoperative care:

You will be nursed in a **high nursing intensity ward** for the first two or three days after the surgery. Your heart rhythm, oxygen levels, urine output, blood pressure and pulse will all be monitored. You will be given **pain killing** medication. Physiotherapists will work with you to **breath deeply and cough** up any spit which settles on your chest.

You will be encouraged to sit out of bed the day after the surgery and gradually mobilise more each day. Your breathing will be more efficient out of bed.

The chest drains will remain while there is any bleeding or air leaking from the lung. They are usually removed after 3 to 4 days.

Most patients are discharged from hospital about a week after the surgery. This will depend on your progress and any complications.

Benefits of the procedure:

- Cure lung cancer
- Remove infected or destroyed lung

Risks of the procedure:

Side effects

The following side-effects are inevitable after lung surgery. The doctors, nurses and physiotherapists will try to keep their effects to a minimum.

Postoperative pain: There will be pain from the area of the incision. This pain will be felt around to the side and front of the chest, following the distribution of the nerve which runs under the rib (the intercostal nerve). There will also be discomfort from the drains which come out between the ribs and may also irritate an intercostal nerve.

The anaesthetist will usually offer you an “**epidural**”. This is a small tube which is placed through the skin and lies alongside the spine, delivering local anaesthetic in the region of the thoracotomy incision. This

will reduce the pain significantly, though you may also need some pain-killing tablets or injections as well. The epidural can have complications itself:

- As it may be difficult for you to pass water, a draining tube (catheter) will be passed into your bladder.
- Bleeding from the epidural tube can cause paralysis. This is a very rare complication but if you have been on any drugs which thin the blood, you will not be offered an epidural.
- Low blood pressure

If an epidural cannot be placed an alternative will be put in place. In this situation you will probably be offered a patient controlled analgesia system (PCAS). Using this you will be able to give yourself a shot of pain-killing medication as you require it. You will be encouraged by the physiotherapists to use enough medication to allow you to move around your bed, breath deeply and cough as required.

The requirement for pain killers decreases quickly over a few days, especially after the drains are removed. You will be started on painkilling tablets at that stage. You will be able to take these home when you are discharged from hospital.

Difficulty breathing: because of the pain, the chest drains and the fact that lung tissue has been removed, your breathing may be more difficult than before the surgery. You will be given oxygen to help the breathing and the physiotherapists will instruct you on how best to breathe and cough. Deep breathing is important as it expands the lung and helps it to heal.

Difficulty coughing: it is important to be able to cough up any secretions (spit) which may collect in the lungs. All smokers produce a lot of secretions. Operating on the lungs also increases the secretions. If these are not coughed up they clog up the lungs and cause pneumonia (severe chest infection). You are encouraged to take enough pain medication to allow you to cough properly. The physiotherapists will help you to cough. If they are not happy with the effectiveness of your cough they will ask the doctors to pass a **minitracheostomy (Mini-trach)**. This is a small tube which is passed through the skin at the front of the throat under local anaesthetic. It will allow the physiotherapists and nurses suck out any secretions that you cannot cough up.

Abnormal heart rhythm (dysrhythmia): the heart is very sensitive after lung surgery. This is partly because the operation is very close to the heart. However, most people having lung surgery have been smokers

and have some coronary artery disease. This makes abnormal heart rhythms more common. Because abnormal rhythms are so common (half of patients will have one) your heart will be monitored using a cardiograph for the first 48 hours. If an abnormal rhythm occurs it usually is corrected by injections of cardiac drugs.

Complications

Lung surgery is **MAJOR** surgery, much more extensive than hernia, gall bladder or bowel surgery. With major surgery complications are very common.

As most people who have lung cancer have been smokers, they will have some lung damage in addition to poor circulation to the heart (coronary artery disease) and poor circulation to other organs of the body. They are at a higher risk for pneumonia, heart attacks and strokes because of this. Though all efforts have been made to ensure you are fit for the surgery, we accept a certain risk as surgery offers the best chance of cure of the cancer. ***It is important to be aware that people die of these operations.*** On average, 3 out of every one hundred people having a lobectomy for lung cancer die of the procedure. This rate is higher if you have had a previous heart attack or angina, or have chronic airways disease or asthma.

Anaesthetic complications:

As with all procedures performed under general anaesthesia reactions to the anaesthetic can occur. While these are uncommon, the more severe reactions can affect the heart (**heart attack** or **abnormal heart beat**), the lungs (**asthmatic attack** or **pneumonia**) or the brain (**stroke** or **fit**).

Complications of the surgery:

Any procedure performed by a surgeon has risks of injury, complication or death. Complications specific to pleurectomy are:

- **Bleeding** – there will be some bleeding after the surgery. This is normal whenever the lung has been cut. A basal chest drain will be inserted to drain excess blood. As the operation involves dissecting around the tumour to tie and cut large blood vessels coming out of the heart, it is possible for there to be major bleeding. While this is usually controlled you may need a blood transfusion. ***It is possible to die from major bleeding.***
- **Air leak** - where the lung has been stapled, sewn, cut or where adhesions have been divided there is the potential for leakage of some air from the lung. An apical drain will be placed to drain air and keep the lung expanded.

- **Prolonged air leak** - if the lung is slow to heal (common if you are on steroid medication) or if the lung is slow to fully re-inflate the air leak may persist for a number of weeks. Where this is the case a portable (flutter bag) drain will be applied and you will be allowed home with district nurse supervision and weekly medical review. Sometimes this is referred to as a broncho-pleural fistula. You may require further surgery to deal with this.
- **Empyema** – an infection in the cavity which holds the lung is called an empyema. In some ways it resembles a large boil (abscess) and therefore has to be drained. Usually this can be done directly through the skin though sometimes further surgery is required.
- **Long-term discomfort:** While the pain settles in about two weeks, there may be vague discomfort in the chest even a number years after the surgery. Incisions can also be painful and the intercostal nerves, which run under each rib, can be irritated by instruments or by the chest drains.
- **Recurrence** – in cancer surgery there is no guarantee of cure. You are being offered surgery because all the tests suggest the tumour is localised and you have a good chance of cure by surgery. However, we recognise that tumours can come back within months or years. If this occurs you will be offered the appropriate treatment which may include chemotherapy or radiotherapy.

Notification of pathology results

The lung is preserved, stained and examined by a pathologist to work out exactly what type of tumour is in the lung, how far it has spread within the lung and whether it has spread to any of the lymph glands in the lung. This process may not have been completed by the time you leave hospital. If not, you will be given an early outpatient appointment to discuss the results.

If the pathology reports suggests that your prognosis may be improved by chemotherapy or radiotherapy, you will be referred to an oncologist (cancer expert) at Belfast City Hospital for an opinion.

Thoracoscopic lung resection

It is now possible to perform some lung resections using keyhole surgery. This is called minimally invasive surgery or video-assisted thoracoscopic surgery (VATS). Either wedge resection or lobectomy can be performed using VATS in certain situations. The potential benefit of this approach is that it requires smaller incisions and patients usually recover more easily from the surgery.

Minimally invasive surgery can have all the complication of the open procedure. The main complications specific to VATS lung resection are:

- **Conversion to thoracotomy** - sometimes because of the presence of adhesions, the inability to collapse the lung or for other technical reasons, it may not be possible to perform the procedure adequately using a fully thoracoscopic approach. In such cases a larger incision will need to be made to allow the surgeon to place his hands into the chest. This occurs in 10-20% of cases.
- **Skin implantation of tumour:** following surgery the tumour is removed in a watertight bag to prevent the spilling of tumour cells into the wound. However, there have been reports of tumour growing in a wound after such surgery.

Warning:

If you are taking any drug which thins the blood, this may increase the risk of bleeding. An alternative may need to be prescribed up to two weeks before the procedure and you may need to be admitted earlier than planned. Please advise your surgeon (or contact his secretary) if you are taking any of the following drugs:

- Warfarin
- Aspirin
- Plavix (Clopidogrel)
- Drugs for treating arthritis such as :
 - Voltarol (diclofenac),
 - Indocid (indomethacin),
 - Brufen (ibuprofen),
 - Ketoralac,
 - Mobic (meloxicam),
 - Celebrex (celecoxib),
 - Vioxx (rofecoxib),
 - Advil,
 - Neurofen,
 - Feldene.

Contact numbers:

- Royal Victoria Hospital Thoracic Surgical Ward 4a: 028 90632016
- Belfast City Hospital Thoracic Surgical Ward 5 South: 028 90263649
- Royal Victoria Hospital Thoracic Secretaries: 028 9063 3730/2027
- Belfast City Hospital Thoracic Secretaries: 028 90263749

Keywords to search the internet

Thoracotomy
Lobectomy
Pneumonectomy
Lung resection
Thoracoscopy
Lung cancer

Useful websites

<http://www.cancerhelp.org.uk/help/default.asp?page=2978>

<http://www.roycastle.org/>

<http://www.mayoclinic.org/lungcancer-rst/>

http://www.hopkinsmedicine.org/jhtop/Surgery/Surgical_Approaches/surgical_approaches.html