Surgical Treatment for Emphysema and Bullous disease: Lung Volume Reduction Surgery (LVRS)

Cardiothoracic Surgery

The aim of this booklet:

- To tell you more about the two diseases which your doctor has already explained to you.
- To help you to understand what will happen to you.
- To explain the reasons for the operation, the procedure itself and potential risks involved in this surgery.
- To explain the care you need before and after surgery.
- To explain other alternatives if you do not wish to go ahead with the surgery
- To make sure you know as much as possible about the procedure before you agree to it and sign the consent form.
- Please feel free to ask any questions raised or not addressed by this booklet. The doctors and nurses are available to support you at this time.

What is Lung Volume Reduction and Bullous Disease?

Chronic Obstructive Pulmonary Disease (COPD) is common, usually progressive and is a leading cause of mortality and morbidity globally.

Despite being primarily a medical disorder (mainly treated with inhalers), Patients with COPD have various presentations for which the surgeon plays a pivotal role:

- Bullous disease (A large air space inside the lung).
- Heterogeneous emphysema (destruction of the air spaces and elasticity of the lung affecting the upper parts more than the lower parts) and emphysema.

With smoking cigarettes (and occasionally other substances, such as cannabis), lung tissue progressively gets destroyed. The beautiful architecture of tiny 'balloons' surrounded by fine network of blood vessels breaks down (see figure 1)

The prevention of infection is a major priority in all healthcare and everyone has a part to play.

- **Please decontaminate your hands frequently for 20 seconds using soap and water or alcohol gel if available**
- **If you have symptoms of diarrhoea and/or vomiting, cough or other respiratory symptoms, a temperature or any loss of taste or smell please do not visit the hospital or any other care facility and seek advice from 111**
- **Keep the environment clean and tidy**
- **Let's work together to keep infections out of our hospitals and care homes.**

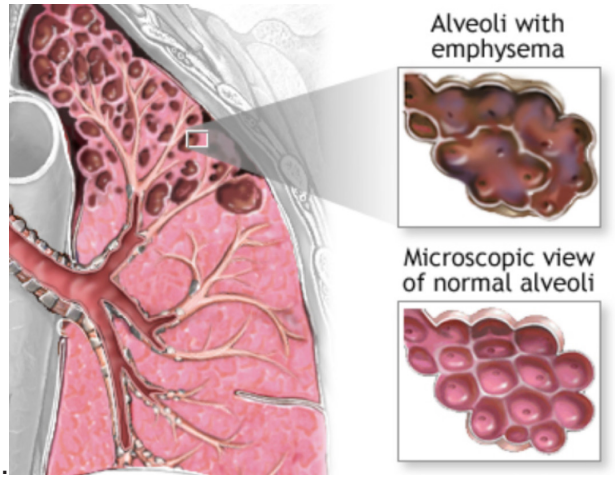

Figure 1

Depending on the severity and distribution, one of the following happens:

This affects the whole lung and can either be equally distributed (homogenous emphysema) or affect some parts of the lung more than others (heterogenous emphysema) (see figure 2).

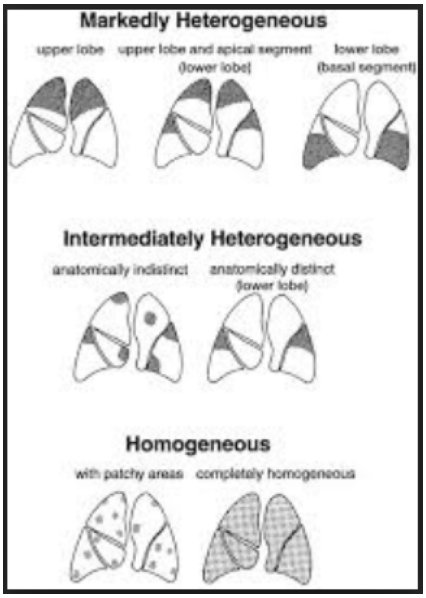

Figure 2

Bullous Disease

Sometimes the smoking impacts on a specific part of the lung causing it to blow up like a large balloon (see figure 3). This takes up space and does not allow room for the functioning lung to expand. It may even 'pop' and leak air around the lung (pneumothorax) which can be life threatening.

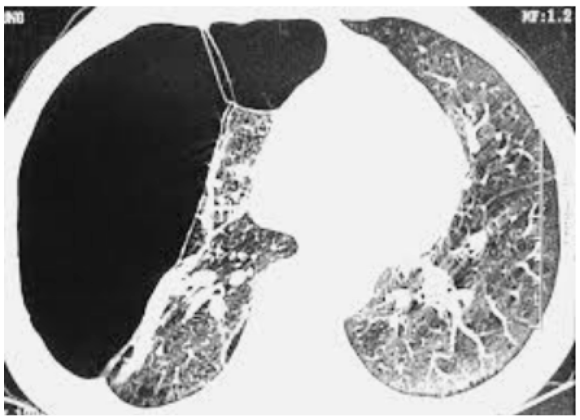

Figure 3 (arrow pointing to Bulla)

What can we do about it?

Smoking cessation:

Even though the damage to the lung is irreversible, stopping smoking will prevent more precious lung loss. Also, over the course of about 2 months, the repair process will improve a bit of the affected lung tissue.

Optimise the use of remaining lung:

With inhalers and exercise you get the most out of your lungs and this is usually achieved by advice from the GP and respiratory consultant.

Surgery:

In selected cases, cutting out the bullous part or the most badly affected lung in heterogeneous emphysema will improve the overall lung function. It also allows the breathing muscles to get back to a better resting position (as they were pushed by the non-functioning diseased lung). This gives them room to work and get more air in and out with each breath.

Patients are often referred to a thoracic (chest) surgeon for surgical management of emphysema after attempting non-surgical methods.

You will normally meet a chest surgeon at a clinic appointment to discuss the reasons for offering surgery, what is involved and any risks associated with the procedure.

It is your decision whether or not to have surgery. The doctors and nurses will be available to offer information, advice and support at this time, so please feel free to ask any questions and discuss concerns you may have.

What are the risks and benefits?

Benefits:

- To improve your exercise tolerance and breathing.
- To decrease the chance of your lung popping and causing a pneumothorax (air around the lung pushing it down, not allowing you to take a deep breath).

Risks

There are nearly always risks to any treatment. Here are the risks which may arise when having a lung surgery:

- Dental injury, during the insertion of the scope or while being put to sleep.
- Air Leaks – the remaining lung may not seal, leading to air leaks. This may be seen not as a risk but as a healing process on the inside. In these cases, leaving the drain in for a longer period will give the lung the chance to heal on the inside.
- Bleeding – there is a risk of bleeding which may require a conversion to an open operation instead of key hole, in order to fix the bleed. If necessary, a transfusion is given.
- Chest infection following surgery, this is usually dealt with by antibiotics and physiotherapy.
- Additional drains are sometimes required.
- Borderline patient may require increased care and require mechanical ventilation to support the lung until they are able to do this for themselves.
- Borderline patients may experience an extended recovery period.
- There is a small risk of death.

Alternatives to having the procedure?

The choice about which treatment is best for you will be made together with your doctor. This will be based on the risks and benefits of the treatment and your individual circumstances.

The alternatives to having a lung surgery by optimising your inhalers and other medicines will have already been made with the respiratory consultant. Physiotherapy is another pathway. There are also newer options such as endobronchial valves, which are placed in your airways to allow air out of the diseased part and not back in (one way valve). The final decision for an operation is made by yourself.

What preparation is needed?

The surgery in its self is simple but the preparations and aftercare are extensive as you may appreciate. You will need to work hard before and after the operation in order to get through this safely.

- Before the operation, you have to be off any form of smoking, even passive smoking is not acceptable.
- You need to start walking progressively longer distances than you are used to. Push yourself to the boundaries.

Pre-admission Clinic:

You may be invited to a pre-admission clinic prior to your admission date to prepare you for your surgery. Your health will be assessed by a nurse and/or doctor. This may involve having a chest X-ray, a heart tracing (ECG), routing blood tests and a breathing test.

Normally, you will be admitted to the ward on the morning of the procedure, or you may be admitted the day before. Further investigations listed below may be:

- Blood tests.
- ECG – heart tracing.

- Chest X-ray.
- A full set of observations – blood pressure, pulse, oxygen levels, temperature, respiratory rate, weight and height.

If you need other tests specific to you these will be explained.

Preparation for your surgery:

- You must not eat anything after midnight the night before your operation, unless otherwise instructed.
- After midnight you can only drink water, and you must stop this at 6am, unless advised otherwise by the anaesthetic & nursing staff.
- It is very important that you do not eat anything for six hours before your surgery. However, you can drink water or black tea up to two hours before your surgery. You can also drink water with any pills that the anaesthetist asks you to take.

It is essential that you follow the fasting instructions above as the procedure cannot be performed if you have not fasted accordingly. If you are unsure, please ask one of the nurses.

Normally, you will be admitted to the ward on the morning of the procedure, or you may be admitted the day before.

- Bring all your medication with you to hospital in their original containers.
- We advise not to bring large sums of money or valuables. If this is unavoidable please ensure you hand them in for safekeeping.
- Unless you need someone to stay to interpret and/or assist you, we ask that relatives/friends who bring you come back when you are ready to go home. If your family members wish to wait with you before the surgery, please mention this to the ward staff.
- You will be allocated a bed on the ward.
- You will be fitted with one wristband with the ward; your name; date of birth and hospital number. If you are allergic to anything you will also need to wear a red band.
  These ensure that staff can identify you correctly and give you the right care. It is important that you do not remove these until you go home. **Please let a member of staff know if you lose one, or if any of the information is incorrect.**
- A nurse will need to complete some paperwork with you and a doctor or nurse specialist / practitioner will take a medical history and do an examination. This may have been done in the pre-admission clinic.
- Further investigations listed below may be performed:
  - Blood tests.
  - ECG – heart tracing.
  - Chest X-ray.
  - A full set of observations - blood pressure, pulse, oxygen levels, temperature, respiratory rate, weight and height.
  - If you need other tests specific to you these will be explained.
  - All patients are screened for MRSA on admission by doing a nose and groin swab.

- The anaesthetic and surgical team will review you and confirm the details of the proposed procedure. The procedure will be explained to you again and any questions you may have will be answered.

- We will ask you to take a bath or shower and put on a clean hospital gown, and also provide you with compression stockings to help prevent blood clots developing during and after surgery.

- We will ask that you remove dentures just prior to the procedure, and to tell us if you have any capped or loose teeth.

- Once everything has been completed a doctor will ask you to sign a consent form giving your permission (consent) for the operation to take place. Normally this has been filled out in the clinic, but the details will be checked.

Before going to theatre the nurses will complete a check-list with you. This will be repeated several times when you go to theatre. This is for your safety.

Consent

We must seek your consent for any procedure or treatment beforehand. Your doctor will explain the risks, benefits and alternatives where relevant before they ask for your consent. If you are unsure about any aspect of the procedure or treatment proposed please do not hesitate to ask for more information.

Medications:

If you take any medications the nurses will advise you which you may take before your operation.

If you have been prescribed pre-medication, the nurse looking after you will give you these one to two hours before the surgery, which may make you a little sleepy. Therefore, it is important that you stay in bed after you have taken the pre-medication or ask for help if you need to get out of bed.

What if you are taking blood thinning medication?

You must tell us if you are taking blood thinning medication as some of these may need stopping 1 week prior to surgery.

What happens during the procedure?

- Before leaving the ward for transfer to the anaesthetic room and operating theatre, we will lock away any personal items for safekeeping until you return to the ward.

- Please pack your toiletries and other small items, which you may need straight after surgery, in a separate bag.

- Before entering the anaesthetic room a member of theatre staff will check your details.

In the anaesthetic room:

- We will check your consent form and wrist band and help you onto the operating table.

- We will place a small drip, usually in the back of the hand, where the general anaesthetic is administered to help you fall asleep.
  For major surgery, we may insert another small tube, usually in the wrist, to continuously measure your blood pressure during surgery. Both of these can be done with a local anaesthetic, so they are not painful.

- We will attach sticky pads (electrodes) on your chest so we can measure your heart rate and oxygen levels in your blood and an oxygen mask placed over your mouth.

- Once you are asleep; a tube is placed down the airway (bronchoscope) where the surgeon looks into your airways and hoovers out any phlegm. At this stage an assessment is done whilst in the anaesthetic room by looking down your windpipe and testing if a valve (endobronchial valve – EBV) can be placed to deflate the overinflated bits of your lung.
  If these are successful then there is no need for surgery and the procedure will finish at this point.
  If they are not suitable, then the surgery (LVRS) is performed and will continue as follows.

- A tube is inserted down the airway and attached to a breathing machine (ventilator) and will support your lungs.

- We will put you onto your side and through key holes (small incisions) or an open incision along your side and back (usually 3 holes about 12mm each).

- A camera is introduced and the part of the lung that is diseased is removed and 'stapled off' leaving the better lung behind sealed (see figure 4)

- A drain is inserted and the remaining lung is inflated.

- You will then be awakened.

The whole procedure should take approximately 180 minutes.

Changes to the planned surgery:

Very rarely, if there is bleeding during the operation that cannot be controlled through the telescope, the surgeon will need to make a larger incision to gain direct vision and control the bleeding.

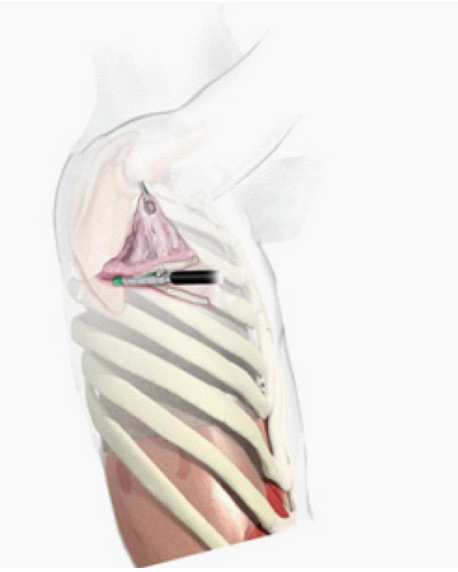

Figure 4: Stapling off diseased lung

What happens after the procedure?

- You will be transferred to the ward to recover.

- You will need to get out of bed and mobilise as soon after the procedure as possible. Patients who do not mobilise as soon as possible may experience delays in recovery.

- You also need to take regular deep breaths and cough any phlegm out to clear the airways. This will help prevent a chest infection, which is the most common cause of extending your length of stay in hospital.

- As mentioned before, all measures are taken to seal the remaining raw surface of lung, despite that; a leak may happen between 10-25% of the time.
- This is not an actual complication but can be considered a healing process on the inside. The solution to that is usually to keep the drain in until the healing completes and the leak stops. Sometimes the drain needs to be put on suction or an extra drain may need to be added.
- In very borderline cases, we may keep patients on mechanical ventilators which take over your breathing till you can do it for yourself.
- Pain is aggressively managed, as we want you to take deep breaths and cough to clear phlegm from the airways. We use different medications to achieve that. If it is still not under control, you need to let the nurse looking after you know.

When can I go home and what aftercare is required?

- The hospital stay after the procedure is approximately one week.
- When the drain comes out and we feel you can self-care, we will prepare for you to go home.
- We review your medications with you and give you clear instructions what to watch out for.
- It is important to stay active to avoid complications.
- DO NOT return to smoking please.
- You will need to arrange transport home; you are not advised to drive.
- We will usually see you in clinic in 2-4 weeks. At that point we will give the results and direct you to the next stage which is treatment.

If all is well, you will be able to resume driving and your regular activities in a staged manner.

Flying is usually not allowed for 6 week after your operation.

We would advise you to contact the ward if you have any of the following:

- Increased shortness of breath.
- Vomiting.
- A high temperature.
- Concerns about your wound(s).

You may be asked to either come back into hospital or to contact your GP.

How to Contact us:

Please feel free to ask any questions raised or not addressed by this booklet. The doctors and nurses are available to support you at this time.

Cardiothoracic Ward / B8
2nd Floor
Wolverhampton Heart and Lung Centre
New Cross Hospital
Wolverhampton
West Midlands
WV10 0QP

Telephone 01902 694306 / 694307

Cardiothoracic Wound Clinic / B3
1st Floor / Outpatient Department
Wolverhampton Heart and Lung Centre
New Cross Hospital
Wolverhampton
West Midlands
WV10 0QP

Telephone 01902 307999 ext 6731

(Monday – Friday 09.00-16.00hrs)

Additional Information is available from:

Patient Liaison Service (PALS)
New Cross Hospital

Tel: 01902 695362. Mobile 07880 601085

Website: PALS@rwh-tr.nhs.uk

English

If you need information in another way like easy read or a different language please let us know.

If you need an interpreter or assistance please let us know.

Lithuanian

Jeigu norėtumėte, kad informacija jums būtų pateikta kitu būdu, pavyzdžiui, supaprastinta forma ar kita kalba, prašome mums apie tai pranešti.

Jeigu jums reikia vertėjo ar kitos pagalbos, prašome mums apie tai pranešti.

Polish

Jeżeli chcieliby Państwo otrzymać te informacje w innej postaci, na przykład w wersji łatwej do czytania lub w innym języku, prosimy powiedzieć nam o tym.

Prosimy poinformować nas również, jeżeli potrzebowaliby Państwo usługi tłumaczenia ustnego lub innej pomocy.

Punjabi

ਜੇ ਤੁਹਾਨੂੰ ਇਹ ਜਾਣਕਾਰੀ ਕਿਸੇ ਹੋਰ ਰੂਪ ਵਿਚ, ਜਿਵੇਂ ਪੜ੍ਹਨ ਵਿਚ ਆਸਾਨ ਰੂਪ ਜਾਂ ਕਿਸੇ ਦੂਜੀ ਭਾਸ਼ਾ ਵਿਚ, ਚਾਹੀਦੀ ਹੈ ਤਾਂ ਕਿਰਪਾ ਕਰਕੇ ਸਾਨੂੰ ਦੱਸੋ।

ਜੇ ਤੁਹਾਨੂੰ ਦੁਭਾਸ਼ੀਏ ਦੀ ਜਾਂ ਸਹਾਇਤਾ ਦੀ ਲੋੜ ਹੈ ਤਾਂ ਕਿਰਪਾ ਕਰਕੇ ਸਾਨੂੰ ਦੱਸੋ।

Romanian

Dacă aveți nevoie de informații în alt format, ca de exemplu caractere ușor de citit sau altă limbă, vă rugăm să ne informați.

Dacă aveți nevoie de un interpret sau de asistență, vă rugăm să ne informați.

Traditional Chinese

如果您需要以其他方式了解信息，如易读或其他语种，请告诉我们。

如果您需要口译人员或帮助，请告诉我们。

Designed & Produced by the Department of Clinical Illustration,
New Cross Hospital, Wolverhampton, WV10 0QP Tel: 01902 695377.

Review Date 16/01/2023 Date Produced 2020 MI_5758314_24.01.20_V_1