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SCTS standards for lung volume reduction (LVR) programmes

Summary

LVR improves survival and quality of life for patients with emphysema.

There is wide variation in access to LVR which needs to be corrected.

This document sets out guidance to assist in the equitable delivery of LVR.

LVR pathways should be integrated into COPD care.

LVR teams and pathways should be established.

Decision making should be via a quorate MDT. The MDT is only quorate if at least one surgeon, chest physician and radiologist are present along with administrative support.

A LVR unit must be able to provide both valves and surgery and have the necessary clinical and administrative resources.

There must be a suitable peri-operative/procedure facility.

Patient follow up for at least 5 years is required.

Data collection and regular service review is mandatory.



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What the standards mean for different audiences

- 1) Patients should feel confident that centres offering LVR procedures are doing so in the context of defined quality of care.
- 2) Service providers wishing to continue or embark on provision of a LVR will have a clear view of what their service needs to provide.
- 3) Healthcare professionals can be clear about their roles within the multidisciplinary team delivering the LVR pathway.
- 4) Commissioners can use them as a framework to ensure that commissioned services are in a position to deliver both quality and high value care for people with emphysema.

British Thoracic Society (BTS)

The British Thoracic Society is pleased to support this important document.



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Glossary

Term	Description
AHP	Allied Health Profession/s/al
A1AT	Alpha-1 Antitrypsin deficiency
BNP	B-type Natriuretic Peptide
BMI	Body Mass Index
BTS	British Thoracic Society
CAT	COPD Assessment Test
BODE	Body Mass Index, Obstruction, Dyspnoea, Exercise
COPD	Chronic Obstructive Pulmonary Disease
CT	Computer Tomography
DECT	Dual-Energy Computer Tomography
ECG	Electrocardiogram
ECHO	Echocardiogram
FBC	Full Blood Count
FEV ₁	Forced Expiratory Volume during first second
GP	General Practitioner
ISWT	Incremental Shuttle Walk Test
LVR	Lung Volume Reduction
MDT	Multi-Disciplinary Team
MRC	Medical Research Council
NHS	National Health Service
NICE	National Institute of Clinical Excellence
NIV	Non-Invasive Ventilation
PFTs	Pulmonary Function Tests
PR	Pulmonary Rehabilitation
Q _i	Perfusion
SCTS	Society for Cardiothoracic Surgery of UK & Ireland
UKLVR	United Kingdom Volume Reduction Surgery
U&E	Urea & Electrolytes
6MWD	6-minute walk distance



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Introduction

Lung Volume Reduction (LVR) treatments aim to improve breathlessness, quality of life, exercise capacity and survival in people with Chronic Obstructive Pulmonary Disease (COPD).

NHS England & Improvement has carefully reviewed the evidence to treat severe emphysema with LVR in adults and concluded that there is enough evidence to make treatments with both surgery and endobronchial duckbill valves available in centres with an experienced multi-disciplinary team (MDT). (NHSE Clinical Commissioning Policy document: Lung volume reduction by surgery or endobronchial valve for severe emphysema in adults NHS England Reference: 200806P [1622])

<https://www.england.nhs.uk/wp-content/uploads/2020/11/1622-Policy.pdf>

There is wide variation in access to LVR.

Commissioners will work to ensure patients have access to LVR treatment. The aim is to correct the current inequity of provision. It is noted that some services are already well developed whereas others will need to develop an LVR pathway and service over time.

These clinical and organisational standards have been produced following two wide-reaching open engagement meetings in May and June 2021, further materials received up to September 2021 which has been followed by multiple small group meetings.

LVR pathways should be integrated into COPD care, consistent with National Institute of Clinical Excellence (NICE) guidance. There should be:

- Systematic consideration of the possibility of a LVR procedure in COPD patients with limiting breathlessness despite optimisation of their care leading, where appropriate to
 - a review to establish the presence of basic criteria for LVR (emphysema and hyperinflation),
 - referral onto a LVR multidisciplinary team.

Regions should establish and support collaborative MDTs and pathways to deliver LVR. The organisation of these will be locally determined but must include certain core members and service.



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The LVR pathway

Surgeons and interventional bronchoscopists should be actively promoting understanding and awareness of LVR among potential referrers so that there is clear understanding of the criteria and mechanisms for referral among chest physicians and others.

Assessment and referral

Basic criteria that should prompt consideration of referral to an LVR team are

- **Hyperinflation**
- **Limiting breathlessness**
- **Severe airflow obstruction** ($FEV_1 < 50\%$)
- **Emphysema**

Typically, LVR consideration will be for people who are still breathless despite optimised care including pulmonary rehabilitation (PR).

Patients may improve considerably with smoking cessation, optimisation of inhaled and other medical therapy and PR. This should be performed prior to actual surgery or valve treatment.

The availability and access to these measures should be such that they do not delay the overall patient pathway. In some situations, access to pulmonary rehabilitation may mean that it is expedient for a person to be referred for LVR evaluation in parallel to referral for PR.

Patients who meet the appropriate criteria should progress through the pathway in an orderly and timely fashion.



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Patients with lung cancer and COPD

During the assessment of lung cancer cases, people with hyperinflation should be considered for LVR assessment and treatment. If the tumour is in an appropriate location, resection can be performed to both remove the tumour and achieve a LVR benefit. This can lead to more cases being considered for curative intent cancer treatment. Such patients may have the combined prognostic benefit of lung cancer treatment and LVRS. These patients still need to be considered by the LVR MDT and should be optimised in the same manner including smoking cessation, sputum reduction and ideally pulmonary rehabilitation.

Further assessment and treatment

It is acknowledged that COPD is a complex condition, that multimorbidity is the norm rather than the exception, and that the proportion of investigation and optimisation undertaken by the LVR team or by referrers will vary between patients and centres.

Flow charts of the patient pathway and how the team may work

The following two flow charts outline two aspects of the programme.

Figure 1 describes the overall elements that will be needed for COPD patients being considered and assessed for LVR. It identifies the components that a complete LVR pathway could include. These elements are all important, but the pattern of their delivery is likely to differ from region to region.

Figure 2 represents a decision-making pathway within the MDT. It shows the pathway that follows referral onto a LVR MDT and the subsequent pathway into LVR or valves or ongoing medical therapy alone.

[Figure 1](#)

[Figure 2](#)



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Investigations/information needed for MDT assessment

- Smoking status (patients should have stopped smoking completely and commit to refrain)
- Medical Research Council (MRC) dyspnoea score
- COPD assessment test (CAT) score
- Exacerbation history/sputum production
- Presence of multimorbidity.
- Use of oxygen/non-invasive ventilation (NIV)
- Medication

- PR history
- Exercise capacity as measured by 6-minute walk distance (6MWD) or incremental shuttle walk test (ISWT)

- CT thorax – pattern of emphysema, fissure integrity, absence of significant bronchiectasis/fibrosis.
- Lung perfusion
- Spirometry, gas transfer, plethysmographic lung volumes, blood gases.
- ECG
- U&E, FBC, BNP

- Echo if LVRS is planned

LVR Centres

A LVR Centre describes a centre with a multidisciplinary team that delivers LVR interventions to people with hyperinflation.

A LVR centre must be able to offer both LVRS and endobronchial valve therapy. This is to ensure that patients receive the best treatment options as determined by the MDT rather than just what may be available locally. Depending on service organisation, the delivery of valves and LVR may be on different sites within a unit.

Patient data should be reviewed in a properly constituted MDT meeting.

In any given centre interventions may be delivered by thoracic surgeons or



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interventional bronchoscopists.

In due course all centres should aim to have at least 2 specialists within each professional and administrative group.

All centres must have administration and nursing/AHP support in addition to the medical professionals.

LVR centre teams should undertake LVR as a regular part of their practice with the clinical and administrative commitment recognised in job plans.

There is no minimum number of cases required but centres will need to regularly undertake these procedures to maintain staff skills and the patient pathway.

All LVR centres must report their data to the SCTS thoracic surgery audit and the UK lung volume reduction (UKLVR) database or agreed alternative.

All centres must report their data to the NHSE dashboard or equivalent national dashboard when this is available.

All centres must produce an annual report and participate in the annual LVR review organised by SCTS/BTS.

It is assumed that centres will treat more patients as they become more established.

All centres should ensure the Trust recognises its role in the COPD pathway which is a NHS Long Term Plan national priority, and as a LVR service. Hence LVR centres will commit management, MDT co-ordination, administrative and audit resources to fulfil this role.

Funding for LVR services is provided as part of the commissioning process.

Centres starting new programmes should be mentored by more established centres.



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The LVR MDT

Recommended membership

All members must have a regular interest in LVR

- Thoracic surgeon
- COPD physician
- Interventional bronchoscopist
- Radiologist
- Nurse/Allied Health Professional (AHP)
- Appropriate administrative support including MDT/pathway coordinator and secretarial support

Centres may wish to include other members for example anaesthetists with an interest in thoracic surgery or members of a lung transplant team.

LVR MDT meetings

Once investigations have been obtained and their condition optimised, all patients considered for LVR should be discussed in the specialist LVR MDT meeting

A MDT is only quorate if at least one surgeon, chest physician and radiologist are present along with administrative support.

All patients should be systematically assessed using nationally agreed templates when available.



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The outcomes of all patients discussed in the LVR MDT meeting should be entered into a prospective database. Possible MDT meeting outcomes include:

- LVR surgery
- LVR by endobronchial valves
- Further investigations and re-discuss
- Potentially suitable but delay
- No LVR option
- Offer assessment for other research intervention
- Not a COPD/LVR case

Local outcomes must be reviewed in a local LVR outcomes (mortality and morbidity) meeting at least 2/year.

LVR Service Timelines

This should follow the national target which is currently 18 weeks from referral to routine non cancer treatment. This will require:

- A robust pathway with early access to pulmonary rehabilitation and medical optimisation.
- The LVR MDT meeting to be held at least once a month.
- Adequate provision of bronchoscopy, theatre and peri-operative facilities.
- Some patients will be deemed to be clinically urgent and should be prioritised accordingly.



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Unit workload

LVR Centre teams should undertake LVR as a regular part of their practice with the clinical and administrative commitment recognised in job plans.

There is no minimum number of cases required but centres will need to regularly undertake these procedures to maintain staff skills and the patient pathway.

It is assumed that centres will grow as they become established.

Procedures and post-procedure care

The thoracic surgery/interventional bronchoscopy unit should include an appropriate peri-operative environment for the recovery of patients and a ward with suitable staffing as set out in the service standards for thoracic surgery units.

Units must be familiar with ambulatory drains and the management of severe surgical emphysema.

There must be the facility for immediate patient review and emergency chest drain placement 24/7/365 by trained clinical staff.

Following endobronchial valve placement, patients must remain in hospital for a minimum of two nights for observation in case of post-procedure pneumothorax. This occurs in about 1 in 4 cases and the risk is greatest early following the procedure.

Clear pathways should address post-discharge pneumothorax, valve expectoration and, where necessary, valve inspection, adjustment, replacement or removal.

Patient follow up

In addition to the needs for the procedure there are the peri-operative needs and ongoing needs of the patients once discharged. With respect to the latter, this is to be locally determined but must include the surgeon or interventional chest physician and the COPD physician and community team.

Patients must receive written information about follow up care and possible



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complications including the potential need for follow up bronchoscopy or surgery.

Rapid out-patient review facilities should be available.

All patients must be offered follow up by the LVR centre for at least 5 years from intervention.

Efficacy assessment should include:

- MRC dyspnoea score
- BMI
- FEV₁
- Exercise capacity (6MWD or ISWT) [allowing BODE or iBODE to be calculated]
- CAT score
- Lung volumes

Safety assessment should include:

- mortality at 3 months and 12 months
- pneumothorax (rate and intervention required)
- persistent air leak (air leak >7 days, with day of surgery as day 0)
- need for further non-elective intervention within 12 months

Patients should be considered for further LVR intervention as appropriate. This should include formal consideration of contralateral intervention or surgery.

The outcomes for patients not offered surgery or intervention should be tracked.



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Resources

Documents submitted by LVR centres with active programmes

Cambridge (Royal Papworth & Addenbrooke's combined service)

- 1a. Cambridge LVRS information
- 1b. Cambridge Hyperinflation booklet

Birmingham

- 2a. UHB Appendix 1- emphysema treatment referral proforma.
- 2b. UHB pathway Emphysema Guideline

Royal Brompton

- 3. RBH LVR pathway figure 1
- 3b. RBH MDT form v10 14-11-19
- 3c. RBH COPD pathway 11-6-21

Leicester

- 4a. Leicester, Emphysema ProformaJan21
- 4b. Leicester, Lung Volume Reduction Multi Disciplinary TeamJan21c

Sheffield

- 5. Sheffield LVRS MDT PROFORMA_2021

Nottingham

- 6a. EBV Patient information sheet
- 6b. EBV post procedure information 2021
- 6c. EBV post procedure information 2019
- 6d. LVR proforma
- 6e. LVR outcome



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Fig 1. Lung volume reduction - Assessment/Optimisation

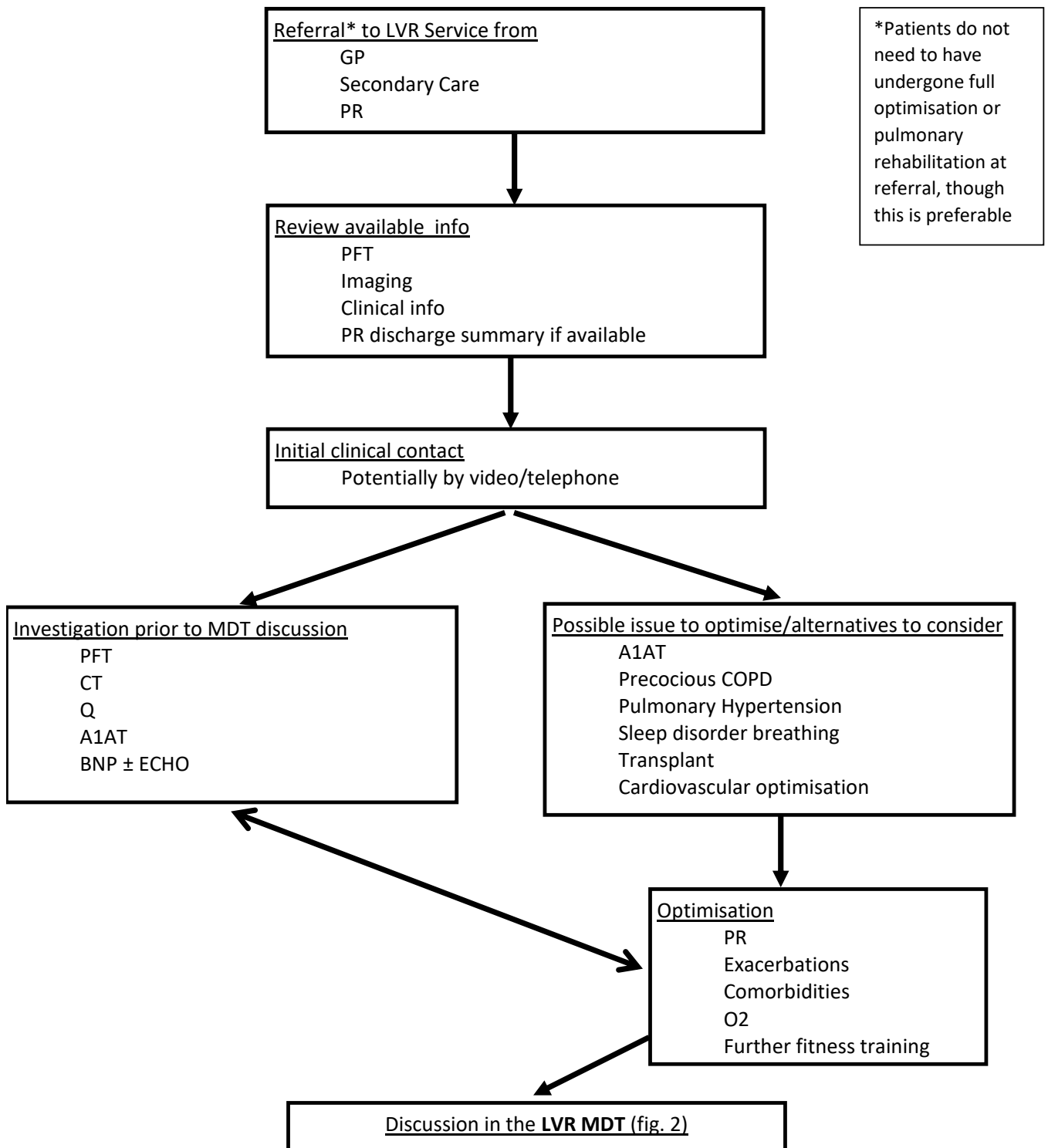


Fig 2. Lung volume reduction - MDT meeting to procedure pathway.

