MASSACHUSETTS

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Medical Policy

Lung Volume Reduction Surgery for Severe Emphysema

Table of Contents

Policy Number: 364

BCBSA Reference Number: 7.01.71
NCD/LCD: National Coverage Determination (NCD) for Lung Volume Reduction Surgery (Reduction Pneumoplasty) (100-3/240.1)

Related Policies

- Endobronchial Valves, #313
- Outpatient Pulmonary Rehabilitation, #136

Policy

Commercial Members: Managed Care (HMO and POS), PPO, and Indemnity

Lung volume reduction surgery as a treatment for emphysema may be **MEDICALLY NECESSARY** in patients with emphysema who meet ALL of the following criteria*:

- Predominantly upper lobe emphysema with hyperinflation and heterogeneity (i.e., target areas for removal), AND
- Forced expiratory volume in one second (FEV-1):
  - For patients who are younger than 70 years of age, the FEV-1 must be no more than 45% of the predicted value, or
  - For patients who are 70 years of age or older, the FEV-1 must be no more than 45% of the predicted value and greater than or equal to 15% of the predicted value.
- Marked restriction in activities of daily living despite maximal medical therapy, AND
- Age younger than 75 years, AND
- Acceptable nutrition status; i.e., 70–130% of ideal body weight, AND
- Ability to participate in a vigorous pulmonary rehabilitation program, AND
- No coexisting major medical problems that would significantly increase operative risk, AND
- Willingness to undertake risk of morbidity and mortality associated with LVRS, AND
- Abstinence from cigarette smoking for at least 4 months.

Lung volume reduction surgery is **INVESTIGATIONAL** in all other patients.

Medicare HMO Blue[SM] and Medicare PPO Blue[SM] Members

BCBSMA covers lung volume reduction surgery (LVRS) for Medicare HMO Blue and Medicare PPO Blue members when all of the following criteria are met in accordance with CMS NCD:

Assessment	Criteria
History and physical examination	• Consistent with emphysema, AND • BMI, ≤31.1 kg/m^2 (men) or ≤ 32.3 kg/m^2 (women), AND • Stable with ≤ 20 mg prednisone (or equivalent) qd, AND
Radiographic	• High Resolution Computer Tomography (HRCT) scan evidence of bilateral emphysema, AND
Pulmonary function (pre-rehabilitation)	• Forced expiratory volume in one second (FEV_1) ≤ 45% predicted ≥ 15% predicted if age ≥ 70 years), AND • Total lung capacity (TLC) ≥ 100% predicted post-bronchodilator, AND • Residual volume (RV) ≥ 150% predicted post-bronchodilator, AND
Arterial blood gas level (pre-rehabilitation)	• PCO_2, ≤ 60 mm Hg (PCO_2, ≤ 55 mm Hg if 1-mile above sea level), AND • PO_2, ≥ 45 mm Hg on room air (PO_2, ≥ 30 mm Hg if 1-mile above sea level), AND
Cardiac assessment	• Approval for surgery by cardiologist if any of the following are present: Unstable angina; left-ventricular ejection fraction (LVEF) cannot be estimated from the echocardiogram; LVEF <45%; dobutamine-radionuclide cardiac scan indicates coronary artery disease or ventricular dysfunction; arrhythmia (>5 premature ventricular contractions per minute; cardiac rhythm other than sinus; premature ventricular contractions on EKG at rest), AND
Surgical assessment	• Approval for surgery by pulmonary physician, thoracic surgeon, and anesthesiologist post-rehabilitation, AND
Exercise	• Post-rehabilitation 6-min walk of ≥ 140 m; able to complete 3 min unloaded pedaling in exercise tolerance test (pre- and post-rehabilitation), AND
Consent	• Signed consents for screening and rehabilitation, AND
Smoking	• Plasma cotinine level ≤13.7 ng/mL (or arterial carboxyhemoglobin ≤ 2.5% if using nicotine products), AND • Nonsmoking for 4 months prior to initial interview and throughout evaluation for surgery, AND
Preoperative diagnostic and therapeutic program adherence	• Must complete assessment for and program of preoperative services in preparation for surgery.

In addition, the patient must have:

- Severe upper lobe predominant emphysema (as defined by radiologist assessment of upper lobe predominance on CT scan), OR
- Severe non-upper lobe emphysema with low exercise capacity.

BCBSMA does not cover LVRS for the following indications, for Medicare HMO Blue and Medicare PPO Blue members in accordance with CMS NCD:

- Patient characteristics carry a high risk for perioperative morbidity and/or mortality,
- The disease is unsuitable for LVRS,
- Medical conditions or other circumstances make it likely that the patient will be unable to complete the preoperative and postoperative pulmonary diagnostic and therapeutic program required for surgery,

- The patient presents with FEV-1 ≤20% of predicted value, and either homogeneous distribution of emphysema on CT scan, or carbon monoxide diffusing capacity of ≤20% of predicted value (high-risk group identified October 2001 by the National Emphysema Treatment Trial (NETT);), and
- The patient satisfies the assessment criteria outlined in the chart above, and has severe, non-upper lobe emphysema with high exercise capacity. High exercise capacity is defined as a maximal workload at the completion of the preoperative diagnostic and therapeutic program that is above 25 watts for women and 40 watts for men (under the measurement conditions for cycle ergometry specified above).

BCBSMA does not cover LVRS for all other indications not otherwise specified, for Medicare HMO Blue and Medicare PPO Blue members in accordance with CMS NCD:

Medical necessity criteria and coding guidance can be found through the link below.

National Coverage Determinations (NCDs)

National Coverage Determination (NCD) for Lung Volume Reduction Surgery (Reduction Pneumoplasty) (100-3/240.1)

Note: To review the specific NCD, please remember to click "accept" on the CMS licensing agreement at the bottom of the CMS webpage.

Prior Authorization Information

Inpatient

- For services described in this policy, precertification/preauthorization **IS REQUIRED** for all products if the procedure is performed **inpatient**.

Outpatient

- For services described in this policy, see below for products where prior authorization **might be required** if the procedure is performed **outpatient**.

	Outpatient
Commercial Managed Care (HMO and POS)	This procedure is performed in the inpatient setting.
Commercial PPO and Indemnity	This procedure is performed in the inpatient setting.
Medicare HMO Blue℠	This procedure is performed in the inpatient setting.
Medicare PPO Blue℠	This procedure is performed in the inpatient setting.

CPT Codes / HCPCS Codes / ICD Codes

Inclusion or exclusion of a code does not constitute or imply member coverage or provider reimbursement. Please refer to the member's contract benefits in effect at the time of service to determine coverage or non-coverage as it applies to an individual member.

Providers should report all services using the most up-to-date industry-standard procedure, revenue, and diagnosis codes, including modifiers where applicable.

CPT Codes

CPT codes:	Code Description
32491	Removal of lung, other than pneumonectomy; with resection-plication of emphysematous lung(s) (bullous or non-bullous) for lung volume reduction, sternal split or transthoracic approach, includes any pleural procedure, when performed

HCPCS Codes

HCPCS codes:	Code Description

G0302	Preoperative pulmonary surgery services for preparation for LVRS, complete course of services to include a minimum of 16 days of services
G0303	Preoperative pulmonary services for preparation for LVRS, 10 to 15 days of services
G0304	Preoperative pulmonary surgery services for preparation for LVRS, 1 to 9 days
G0305	Post-discharge pulmonary surgery services after LVRS, minimum of 6 days of services

ICD-10 Procedure Codes

ICD-10-PCS procedure codes:	Code Description
0BBC0ZZ	Excision of Right Upper Lung Lobe, Open Approach
0BBC4ZZ	Excision of Right Upper Lung Lobe, Percutaneous Endoscopic Approach
0BBD0ZZ	Excision of Right Middle Lung Lobe, Open Approach
0BBD4ZZ	Excision of Right Middle Lung Lobe, Percutaneous Endoscopic Approach
0BBF0ZZ	Excision of Right Lower Lung Lobe, Open Approach
0BBF4ZZ	Excision of Right Lower Lung Lobe, Percutaneous Endoscopic Approach
0BBG0ZZ	Excision of Left Upper Lung Lobe, Open Approach
0BBG4ZZ	Excision of Left Upper Lung Lobe, Percutaneous Endoscopic Approach
0BBH0ZZ	Excision of Lung Lingula, Open Approach
0BBH4ZZ	Excision of Lung Lingula, Percutaneous Endoscopic Approach
0BBJ0ZZ	Excision of Left Lower Lung Lobe, Open Approach
0BBJ4ZZ	Excision of Left Lower Lung Lobe, Percutaneous Endoscopic Approach
0BBK0ZZ	Excision of Right Lung, Open Approach
0BBK4ZZ	Excision of Right Lung, Percutaneous Endoscopic Approach
0BBL0ZZ	Excision of Left Lung, Open Approach
0BBL4ZZ	Excision of Left Lung, Percutaneous Endoscopic Approach
0BBM0ZZ	Excision of Bilateral Lungs, Open Approach
0BBM4ZZ	Excision of Bilateral Lungs, Percutaneous Endoscopic Approach

Description

Emphysema

Emphysema is an anatomically defined condition characterized by destruction and enlargement of lung alveoli. It is one of the conditions considered as a chronic obstructive pulmonary disease along with chronic bronchitis and small airways disease. The pathogenesis of emphysema is primarily related to cigarette smoking leading to inflammation and recruitment of immune cells to the terminal air spaces of the lung. The resultant extracellular matrix proteolysis damages the lung. Destruction of the gas exchanging air spaces and ineffective repair of the extracellular matrix results in airspace enlargement. Emphysema can be characterized into distinct pathologic subtypes. Centriacinar emphysema is most frequently associated with cigarette smoking, is usually most prominent in the upper lobes and superior segments of the lower lobes and is focal. Panacinar emphysema is characterized by abnormally large air spaces evenly distributed across acini in the lower lobes. It is associated with α_1-antitrypsin deficiency. Key pulmonary function parameters are the volume of the first forced expiratory volume in 1 second (FEV1) and the total volume of air exhaled during the spirometry (forced vital capacity). Airflow obstruction related to chronic obstructive pulmonary disease is characterized by the reduced ratio of forced expiratory volume in 1 second/forced vital capacity and reduction in FEV1 correlates with long-term mortality risk.[1,]

Lung Volume Reduction Surgery

Lung volume reduction is a surgical treatment for patients with severe emphysema. The procedure involves the excision of peripheral emphysematous lung tissue, generally from both upper lobes.

The mechanism of clinical improvement for patients undergoing lung reduction surgery has not been firmly established. However, it is believed that mechanical factors such as elastic recoil and diaphragmatic function are improved by reducing the volume of the hyperinflated diseased lung. In addition to changes in the chest wall and respiratory mechanics, the surgery is purported to correct ventilation-perfusion mismatch and improve right ventricular filling.

Complications from the surgical procedure include death, reintubation, arrhythmias, mechanical ventilation for more than 2 days, pneumonia, wound infection, and persistent air leak.

Research on lung volume reduction surgery has focused on defining the subgroup of patients most likely to benefit from the procedure. Potential benefits of the procedure (eg, improvement in functional capacity and quality of life) must be weighed against the potential risk of the procedure (eg, the risk of postoperative mortality).

Summary

Description

Lung volume reduction surgery (LVRS) is proposed as a treatment option for patients with severe emphysema who have failed optimal medical management. The procedure involves the excision of diseased lung tissue to reduce symptoms and improve quality of life.

For individuals who have upper-lobe emphysema who receive LVRS, the evidence includes randomized controlled trials (RCTs) and systematic reviews of the trials. Relevant outcomes are overall survival, symptoms, functional outcomes, quality of life, and treatment-related mortality. Findings from the National Emphysema Treatment Trial (NETT), a multicenter RCT, have suggested that LVRS is effective at reducing mortality and improving quality of life in select patients with severe emphysema. In subgroup analysis, LVRS offered a survival advantage only to patients not considered at high-risk who had predominately upper-lobe emphysema and low initial exercise capacity. Patients with upper-lobe emphysema, regardless of initial exercise capacity, experienced significant improvement in exercise capacity and quality of life after LVRS. Other, smaller RCTs have generally had similar findings, though they have tended to be underpowered for some outcomes and did not stratify by the distribution of emphysema. The evidence is sufficient to determine that the technology results in a meaningful improvement in the net health outcome.

For individuals who have non-upper-lobe emphysema who receive LVRS, the evidence includes subgroup analysis of a large RCT. Relevant outcomes are overall survival, symptoms, functional outcomes, quality of life, and treatment-related mortality. In the subgroup analysis of the NETT, LVRS offered a survival advantage only to patients who had predominately upper-lobe emphysema. For the subgroup with predominately non-upper-lobe emphysema, the NETT did not find significant mortality advantages or symptom improvement with LVRS. Although the NETT had positive findings for the study population as a whole, given the surgical risks, additional data are needed to confirm the net health outcome in patients with non-upper-lobe emphysema. The evidence is insufficient to determine the effects of the technology on health outcomes.

Policy History

Date	Action
8/2020	BCBSA National medical policy review. Description, summary and references updated. Policy statements unchanged.
8/2019	BCBSA National medical policy review. Description, summary and references updated. Policy statements unchanged.
7/2018	New references added from BCBSA National medical policy. Background and summary clarified.
7/2017	New references added from BCBSA National medical policy.

7/2016	New references added from BCBSA National medical policy.
8/2015	New references added from BCBSA National medical policy.
9/2014	New references added from BCBSA National medical policy.
6/2014	Updated Coding section with ICD10 procedure and diagnosis codes, effective 10/2015.
2/2014	Coding information clarified.
8/2013	New references from BCBSA National medical policy.
11/2011-4/2012	Medical policy ICD 10 remediation: Formatting, editing and coding updates. No changes to policy statements.
4/2011	Reviewed - Medical Policy Group - Cardiology and Pulmonology. No changes to policy statements.
11/2010	BCBSA National medical policy review. Changes to policy statements.
3/2010	Reviewed - Medical Policy Group - Allergy and ENT/Otolaryngology. No changes to policy statements.
3/2009	Reviewed - Medical Policy Group - Allergy and ENT/Otolaryngology. No changes to policy statements.
3/2008	Reviewed - Medical Policy Group - Allergy and ENT/Otolaryngology. No changes to policy statements.
3/2007	Reviewed - Medical Policy Group - Allergy and ENT/Otolaryngology. No changes to policy statements.

Information Pertaining to All Blue Cross Blue Shield Medical Policies

Click on any of the following terms to access the relevant information:

Medical Policy Terms of Use
Managed Care Guidelines
Indemnity/PPO Guidelines
Clinical Exception Process
Medical Technology Assessment Guidelines

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