

Lung Volume Reduction Surgery

Last Review Date: August 11, 2017

Number: MG.MM.SU.30bC10

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Definition

Lung volume reduction surgery (LVRS), or reduction pneumoplasty (also referred to as lung shaving or lung contouring), is performed on patients with severe emphysema in order to allow the remaining compressed lung to expand and thus improve respiratory function.

Guideline

Members are eligible for coverage of bilateral excision of a damaged lung with stapling performed via median sternotomy or video-assisted thoracoscopic surgery when all the criteria in the table below are met.

ASSESSMENT	CRITERIA
History and physical examination	Consistent with emphysema.
	BMI \leq 31.1 kg/m ² (men) or \leq 32.3 kg/m ² (women).
	Stable with \leq 20 mg prednisone (or equivalent) daily.
Radiographic	Appropriate computed tomography (CT) scans and/or perfusion scintigraphy for evidence of bilateral emphysema.
Pulmonary function (pre-rehabilitation)	Forced expiratory volume in 1 s (FEV ₁) \leq 45% predicted (\geq 15% predicted if age \geq 70 yr).
	Total lung capacity \geq 100% predicted post bronchodilator.
	Residual volume \geq 150% predicted post bronchodilator.
Arterial blood gas level (pre-rehabilitation)	PCO ₂ \leq 60 mm Hg (PCO ₂ \leq 55 mm Hg if 1 mi above sea level).
	PO ₂ \geq 45 mm Hg on room air (PO ₂ \geq 30 mm Hg if 1 mi above sea level).

Cardiac assessment	<p>Approval for surgery by cardiologist if any of the following are present:</p> <ul style="list-style-type: none"> ▪ Unstable angina: Left ventricular ejection fraction (LVEF) cannot be estimated from the echocardiogram (Echo). ▪ LVEF < 45%: Dobutamine-radionuclide cardiac scan indicates coronary artery disease (CAD) or ventricular dysfunction. ▪ Arrhythmia (> 5 premature ventricular contractions per min; cardiac rhythm other than sinus). ▪ Premature ventricular contractions on resting electrocardiogram. ▪ Pulmonary hypertension: Echo or right-heart catheterization. <p>Any noninvasive cardiac testing that indicates CAD or ventricular dysfunction may be utilized.</p>
Surgical assessment	Approval for surgery by pulmonary physician, thoracic surgeon and anesthesiologist post rehabilitation.
Exercise	Post-rehabilitation 6-min walk of ≥ 140 m; able to complete 3 min unloaded pedaling in exercise tolerance test (pre- and post-rehabilitation).
Consent	Signed consents for screening and rehabilitation.
Smoking	<p>Plasma nicotine level ≤ 13.7 ng/mL (or arterial carboxyhemoglobin $\leq 2.5\%$ if using nicotine-containing smoking-cessation products).</p> <p>Nonsmoking for 4 mos. prior to initial interview and throughout evaluation for surgery.</p>
Preoperative diagnostic and therapeutic program adherence	Must complete assessment for, and program of, preoperative services in preparation for surgery.

In addition to the criteria above, the member must have:

- Severe non-upper-lobe emphysema with low exercise capacity (patients with low exercise capacity are those whose maximal exercise capacity is ≤ 25 watts for women and ≤ 40 watts for men post completion of the preoperative therapeutic program in preparation for LVRS. Exercise capacity is measured by incremental maximal and symptom-limited exercise with a cycle ergometer utilizing a 5- or 10-watt-per-minute ramp on 30 % oxygen after 3 minutes of unloaded pedaling).
- Severe upper lobe-predominant emphysema (as defined by radiologist assessment of upper lobe predominance on CT scan).

Facility Requirements for Medicare Members

LVRS is reasonable and necessary only when performed at facilities that are:

- Certified by the Joint Commission on Accreditation of Healthcare Organizations (Joint Commission) under the LVRS Disease-Specific Care Certification Program (program standards and requirements as printed in the Joint Commission's October 25, 2004, Disease-Specific Care Certification Program packet).

OR

- Approved as Medicare lung or heart-lung transplantation hospitals.

Medicare-approved facilities may be referenced at <http://www.cms.gov/Medicare/Medicare-General-Information/MedicareApprovedFacilitie/Lung-Volume-Reduction-Surgery-LVRS.html>

Prior Diagnostic and Therapeutic Service Prerequisites

The surgery must be preceded and followed by a program of diagnostic and therapeutic services consistent with those that were provided in the National Emphysema Treatment Trial (NETT) and designed to maximize the member's potential to successfully undergo and recover from surgery. The program must include the following:

- 6–10-week series of ≥ 16 and ≤ 20 preoperative sessions, each lasting a minimum of 2 hours.
- ≥ 6 and ≤ 10 postoperative sessions, each lasting a minimum of 2 hours, within 8–9 weeks of the LVRS.

The program must also:

- Be consistent with the care plan developed by the treating physician following performance of a comprehensive evaluation of the member's medical, psychosocial and nutritional needs.
- Be consistent with the preoperative and postoperative services provided in the NETT.
- Be arranged, monitored and performed under the coordination of the facility where the surgery takes place.

Limitations/Exclusions

LVRS is not considered medically necessary for any of the following clinical circumstances:

- Member's characteristics carry a high risk for perioperative morbidity and 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 member presents with FEV₁ of 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 11, 2001, by the NETT).

OR

- The member satisfies the criteria outlined in the table 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 > 25 watts for women and > 40 watts for men (under the measurement conditions for cycle ergometry specified on pages 2 and 3).

Applicable Procedure Codes

32491	Removal of lung, other than pneumonectomy; with resection-pleurotomy of emphysematous lung(s) (bullous or non-bullous) for lung volume reduction, sternal split or transthoracic approach, includes any pleural procedure, when performed
G0302	Preoperative pulmonary surgery services for preparation for LVRS, complete course of services, to include a minimum of 16 days of service
G0303	Preoperative pulmonary surgery services for preparation for LVRS, 10 to 15 days of services
G0304	Preoperative pulmonary surgery services for preparation for LVRS, 1 to 9 days of services
G0305	Post discharge pulmonary surgery services after LVRS, minimum of 6 days of services

Applicable ICD-10 Codes

J43.1	Panlobular emphysema
J43.2	Centrilobular emphysema
J43.8	Other emphysema
J43.9	Emphysema, unspecified

References

Centers for Medicare & Medicaid Services. National Coverage Determination (NCD) for Lung Volume Reduction Surgery (Reduction Pneumoplasty). November 2005.

Specialty-matched clinical peer review.