BlueCross BlueShield Federal Employee Program.

FEP Medical Policy Manual

FEP 7.03.07 Lung and Lobar Lung Transplant

Annual Effective Policy Date: January 1, 2024

Original Policy Date: March 2012

Related Policies:

7.03.08 - Heart/Lung Transplant
8.03.05 - Outpatient Pulmonary Rehabilitation

Lung and Lobar Lung Transplant

Description

Description

A lung transplant consists of replacing all or part of diseased lungs with healthy lung(s) or lobes. Transplantation is an option for patients with end-stage lung disease.

In 2022 , 42,880 transplants were performed in the United States procured from more than 14,900 deceased donors and 6,400 living donors.[2,] Lung transplants were the fourth most common procedure with 2,692 transplants performed from both deceased and living donors in 2022.

End-stage lung disease may derive from different etiologies. The most common indications for lung transplantation are chronic obstructive pulmonary disease, idiopathic pulmonary fibrosis, cystic fibrosis, a_1-antitrypsin deficiency, and idiopathic pulmonary arterial hypertension. Before consideration for transplant, patients should be receiving maximal medical therapy, including oxygen supplementation, or surgical options, such as lung volume reduction surgery for chronic obstructive pulmonary disease. Lung or lobar lung transplantation is an option for patients with end-stage lung disease despite these measures.

A lung transplant refers to single-lung or double-lung replacement. In a single-lung transplant, only 1 lung from a deceased donor is provided to the recipient. In a double-lung transplant, both the recipient's lungs are removed and replaced by the donor's lungs. In a lobar transplant, a lobe of the donor's lung is excised, sized appropriately for the recipient's thoracic dimensions, and transplanted. Donors for lobar transplant have primarily been living-related donors, with 1 lobe obtained from each of 2 donors (generally friends or family members) in cases for which bilateral transplantation is required. There are also cases of cadaver lobe transplants.

Potential recipients who are 12 years of age and older are ranked according to the Lung Allocation Score.[3,] A score may range between 0 and 100 and incorporates predicted survival after transplantation and predicted survival on the waiting list; the Lung Allocation Score takes into consideration the

patient's disease and clinical parameters. The waiting list incorporates the Lung Allocation Score, geography, and blood type classifications. Children younger than 12 years old receive priority for lung allocation. Under this system, children younger than 12 years old with respiratory lung failure and/or pulmonary hypertension who meet criteria are considered "priority 1", and all other candidates in the age group are considered "priority 2". A lung review board has the authority to adjust scores on appeal for adults and children.

OBJECTIVE

The objectives of this evidence review are to determine whether lung or a lobar lung transplant in individuals with end-stage pulmonary disease and whether lung or a lobar retransplant in individuals with prior lung or lobar transplant improve the net health outcome.

POLICY STATEMENT

Lung transplantation may be considered **medically necessary** for carefully selected individuals with irreversible, progressively disabling, end-stage pulmonary disease unresponsive to maximum medical therapy (see Policy Guidelines).

A lobar lung transplant from a living or deceased donor may be considered **medically necessary** for carefully selected individuals with end-stage pulmonary disease (see Policy Guidelines).

Lung or lobar lung retransplantation after a failed lung or lobar lung transplant may be considered **medically necessary** in individuals who meet criteria for lung transplantation.

Lung or lobar lung transplantation is considered **investigational** in all other situations.

POLICY GUIDELINES

Contraindications

The factors below are potential contraindications subject to the judgment of the transplant center:

- Known current malignancy, including metastatic cancer
- Recent malignancy with high risk of recurrence
- Untreated systemic infection making immunosuppression unsafe, including chronic infection
- Other irreversible end-stage diseases not attributed to lung disease
- History of cancer with a moderate risk of recurrence
- Systemic disease that could be exacerbated by immunosuppression
- Psychosocial conditions or chemical dependency affecting ability to adhere to therapy

Policy specific:

- Coronary artery disease not amenable to percutaneous intervention or bypass grafting, or associated with significant impairment of left ventricular function[a]; or
- Colonization with highly resistant or highly virulent bacteria, fungi, or mycobacteria.

[a] Some patients may be candidates for combined heart and lung transplantation (see evidence review 7.03.08).

Individuals must meet United Network for Organ Sharing guidelines for a Lung Allocation Score greater than zero.

Lung-Specific Guidelines

Bilateral lung transplantation is typically required when chronic lung infection and disease is present (ie, associated with cystic fibrosis and bronchiectasis). Some, but not all, cases of pulmonary hypertension will require bilateral lung transplantation.

Bronchiolitis obliterans is associated with chronic lung transplant rejection, and thus may be the etiology of a request for lung retransplantation.

BENEFIT APPLICATION

Experimental or investigational procedures, treatments, drugs, or devices are not covered (See General Exclusion Section of brochure).

FDA REGULATORY STATUS

Solid organ transplants are a surgical procedure and, as such, are not subject to regulation by the U.S. Food and Drug Administration (FDA).

The FDA regulates human cells and tissues intended for implantation, transplantation, or infusion through the Center for Biologics Evaluation and Research, under Code of Federal Regulation Title 21, parts 1270 and 1271.Solid organs used for transplantation are subject to these regulations.

RATIONALE

Summary of Evidence

For individuals who have end-stage pulmonary disease who receive a lung transplant, the evidence includes case series and registry studies. Relevant outcomes are overall survival (OS), change in disease status, and treatment-related mortality and morbidity. International registry data on a large number of patients receiving lung transplantation (>50,000) found relatively high patient survival rates, especially among those who survived the first year posttransplant. After adjusting for potential confounding factors, survival did not differ significantly after single- or double-lung transplant. Lung transplantation may be the only option for some patients with end-stage lung disease. The evidence is sufficient to determine that the technology results in an improvement in the net health outcome.

For individuals who have end-stage pulmonary disease who receive a lobar lung transplant, the evidence includes case series and systematic reviews. Relevant outcomes are OS, change in disease status, and treatment-related mortality and morbidity. There are less data on lung lobar transplants than on whole-lung transplants, but several case series have reported reasonably similar survival outcomes between the procedures, and lung lobar transplants may be the only option for patients unable to wait for a whole-lung transplant. A 2017 systematic review found 1-year survival rates in available published studies ranging from 50% to 100%. The evidence is sufficient to determine that the technology results in an improvement in the net health outcome.

For individuals with a prior lung or lobar transplant who meet criteria for a lung transplant and receive a lung or lobar lung retransplant, the evidence includes case series and registry studies. Relevant outcomes are OS, change in disease status, and treatment-related mortality and morbidity. Data from registries and case series have found favorable outcomes with lung retransplantation in patients who meet criteria for initial lung transplantation. Given the exceedingly poor survival prognosis without retransplantation of patients who have exhausted other treatments, the evidence of a moderate level of posttransplant survival may be considered sufficient in this patient population. The evidence is sufficient to determine that the technology results in an improvement in the net health outcome.

SUPPLEMENTAL INFORMATION

Practice Guidelines and Position Statements

Guidelines or position statements will be considered for inclusion in 'Supplemental Information' if they were issued by, or jointly by, a US professional society, an international society with US representation, or National Institute for Health and Care Excellence (NICE). Priority will be given to guidelines that are informed by a systematic review, include strength of evidence ratings, and include a description of management of conflict of interest.

International Society for Heart and Lung Transplantation

Initial Transplant

In 2021, the International Society for Heart and Lung Transplantation published updated consensus-based guidelines on the selection of lung transplant candidates.[29,] The guidelines states that:

- "Lung transplantation should be considered for adults with chronic, end-stage lung disease who meet all the following general criteria:

1. High (>50%) risk of death from lung disease within 2 years if lung transplantation is not performed.
2. High (>80%) likelihood of 5-year post-transplant survival from a general medical perspective provided that there is adequate graft function."

The guideline also notes risk factors to be considered in the evaluation of transplant candidates, along with pediatric and disease-specific considerations.

Retransplant

The 2021 guideline update briefly addressed lung retransplantation, with the consensus statement noting that "The outcomes after re-transplants are inferior compared to first lung transplants, particularly if the re-transplant is done within the first year after the original transplant or for patients with restrictive allograft syndrome (RAS) [...] In the pre-transplant evaluation of such patients, particular emphasis should be focused on understanding the possible reasons for the graft failure, such as alloimmunization, poor adherence, gastroesophageal reflux, or repeated infections". [29,]

American Thoracic Society et al

Evidence-based recommendations from the American Thoracic Society and 3 international cardiac societies were published in 2011 for the diagnosis and management of patients with idiopathic fibrosis.[30,] For appropriately selected patients with idiopathic pulmonary fibrosis, the international guideline panel recommended lung transplantation (strong recommendation, low-quality evidence). An updated to this document was published in 2015 in which the committee did not make a recommendation regarding single versus bilateral lung transplantation in patients with idiopathic fibrosis.[31,] The committee stated that "it is unclear whether single or bilateral lung transplantation is preferential for long-term outcomes".

In 2022, the American Thoracic Society along with the 3 other international cardiac societies published updated guidance on diagnosis and management of idiopathic pulmonary fibrosis and progressive pulmonary fibrosis.[32,] In terms of treatment considerations, the committee stated that "patients at increased risk of mortality should be referred for lung transplantation at diagnosis".

In 2014, the American Thoracic Society published guidelines on the management of bronchiolitis obliterans syndrome in lung transplant recipients in conjunction with the International Society for Heart and Lung Transplantation and the European Respiratory Society.[33,] The guideline recommends referral to a transplant surgeon to be evaluated for retransplantation for end-stage bronchial obliterans syndrome that is refractory to other therapies.

U.S. Preventive Services Task Force Recommendations

Not applicable.

Medicare National Coverage

Lung transplantation is covered under Medicare when performed in a facility approved by Medicare as meeting institutional coverage criteria.[34,] The Centers for Medicare & Medicaid Services have stated that, under certain limited cases, exceptions to the facility-related criteria may be warranted if there is justification and the facility ensures safety and efficacy objectives.

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POLICY HISTORY - THIS POLICY WAS APPROVED BY THE FEP® PHARMACY AND MEDICAL POLICY COMMITTEE ACCORDING TO THE HISTORY BELOW:

Date	Action	Description
March 2012	New policy	
March 2013	Replace policy	Policy updated with literature review. In lobar lung statement, "children and adolescents, replaced with "carefully selected patients.,
March 2014	Replace policy	Policy updated with literature review. Policy statement added indicating lung or lobar lung re-transplantation may be medically necessary. Policy statement added that lung or lobar lung transplantation is considered investigational in all other situations. References updated.
March 2015	Replace policy	Policy updated with literature review through December 18, 2014.Policy statement unchanged. References 6, 8, 11, 25, and 29 added.
December 2017	Replace policy	Policy updated with literature review through July 22, 2017; references 2- 3, 9, and 17 added. Conditions for covered indications moved to Policy Guidelines.
December 2018	Replace policy	Policy updated with literature review through June 21, 2018; references 2, 18, 20-21, and 26-28 added. Policy statement unchanged.
December 2019	Replace policy	Policy updated with literature review through June 10, 2019; no references added. Policy statements unchanged.
December 2020	Replace policy	Policy updated with literature review through June 30, 2020; references added. Policy statements unchanged.
December 2021	Replace policy	Policy updated with literature review through June 29, 2021; no references added. Policy statements unchanged.
December 2022	Replace policy	Policy updated with literature review through June 23, 2022; references added. Minor editorial refinements to policy statements; intent unchanged.
December 2023	Replace policy	Policy updated with literature review through June 21, 2023; references added. Policy statements unchanged.