Medical Policy
Heart Transplant

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Policy Number: 197
BCBSA Reference Number: 7.03.09
NCD/LCD: NA

Related Policies
• Heart-Lung Transplant, #269
• Total Artificial Hearts and Ventricular Assist Devices, #280
• Laboratory Tests for Heart Transplant Rejection, #530
• Immune Cell Function Assay in Solid Organ Transplantation, #182

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

Human heart transplantation may be considered MEDICALLY NECESSARY for selected adults and children with end-stage heart failure when any one of the following criteria are met:

Adult Patients
1. Accepted Indications for Transplantation
   a. Hemodynamic compromise due to heart failure demonstrated by any of the following 3 bulleted items:
      • Maximal Vo₂ (oxygen consumption) <10 mL/kg/min with achievement of anaerobic metabolism
      • Refractory cardiogenic shock
      • Documented dependence on intravenous inotrope support to maintain adequate organ perfusion
   or
   b. Severe ischemia consistently limiting routine activity not amenable to bypass surgery or angioplasty, or
   c. Recurrent symptomatic ventricular arrhythmias refractory to ALL accepted therapeutic modalities.
2. Probable Indications for Cardiac Transplantation
   a. Maximal Vo₂ <14 mL/kg/min and major limitation of the patient’s activities, or
b. Recurrent unstable ischemia not amenable to bypass surgery or angioplasty, or

3. The following conditions are inadequate indications for transplantation unless other factors as listed above are present:
   a. Ejection fraction <20%
   b. History of functional class III or IV symptoms of heart failure
   c. Previous ventricular arrhythmias
   d. Maximal $V_o^2 > 15 \text{ mL/kg/min.}$

**Pediatric Patients**

Patients with heart failure with persistent symptoms at rest who require one or more of the following:
- Continuous infusion of intravenous inotropic agents, or
- Mechanical ventilatory support, or
- Mechanical circulatory support, or

Patients with pediatric heart disease with symptoms of heart failure who do not meet the above criteria but who have:
- Severe limitation of exercise and activity (if measurable, such patients would have a peak maximum oxygen consumption <50% predicted for age and sex); or
- Cardiomyopathies or previously repaired or palliated congenital heart disease and growth failure attributable to the heart disease; or
- Near sudden death and/or life-threatening arrhythmias untreatable with medications or an implantable defibrillator; or
- Restrictive cardiomyopathy with reactive pulmonary hypertension; or
- Reactive pulmonary hypertension and risk of developing fixed, irreversible elevation of pulmonary vascular resistance that could preclude orthotopic heart transplantation in the future; or
- Anatomical and physiological conditions likely to worsen the natural history of congenital heart disease in infants with a functional single ventricle; or
- Anatomical and physiological conditions that lead to heart transplantation without systemic ventricular dysfunction.

Heart retransplantation after a failed primary heart transplant may be considered **MEDICALLY NECESSARY** in patients who meet criteria for heart transplantation.

Heart transplantation is **INVESTIGATIONAL** in all other situations.

In addition to the above information, we do not cover heart transplantation when any of the following conditions are present:

- Known current malignancy, including metastatic cancer
- Recent malignancy with high risk of recurrence
  - Note: the assessment of risk of recurrence for a previously treated malignancy is made by the transplant team; providers must submit a statement with an explanation of why the patient with a recently treated malignancy is an appropriate candidate for a transplant.
- Untreated systemic infection making immunosuppression unsafe, including chronic infection
- Other irreversible end-stage disease not attributed to heart or 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
- Pulmonary hypertension that is fixed as evidenced by pulmonary vascular resistance (PVR) greater than 5 Wood units, or transpulmonary gradient (TPG) greater than or equal to 16 mm/Hg despite treatment*
• Severe pulmonary disease despite optimal medical therapy, not expected to improve with heart transplantation.*

*Some patients may be candidates for combined heart-lung transplantation (See policy #269).

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.

| 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.

The following codes are included below for informational purposes only; this is not an all-inclusive list.

The above medical necessity criteria MUST be met for the following codes to be covered for Commercial Members: Managed Care (HMO and POS), PPO, Indemnity, Medicare HMO Blue and Medicare PPO Blue:

CPT Codes

<table>
<thead>
<tr>
<th>CPT codes</th>
<th>Code Description</th>
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<tbody>
<tr>
<td>33945</td>
<td>Heart transplant, with or without recipient cardiectomy</td>
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</table>

ICD-10 Procedure Codes

<table>
<thead>
<tr>
<th>ICD-10-PCS procedure codes</th>
<th>Code Description</th>
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<tbody>
<tr>
<td>02YA0Z0</td>
<td>Transplantation of Heart, Allogeneic, Open Approach</td>
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<tr>
<td>02YA0Z1</td>
<td>Transplantation of Heart, Syngeneic, Open Approach</td>
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Description

Heart Failure
In the U. S., approximately 6.5 million people 20 years of age and older have heart failure and 309000 die each year from this condition.1 The reduction of cardiac output is considered to be severe when systemic circulation cannot meet the body’s needs under minimal exertion.

Heart failure may be due to a number of differing etiologies, including ischemic heart disease, cardiomyopathy, or congenital heart defects. The leading indication for a heart transplant has shifted over
time from ischemic to nonischemic cardiomyopathy. From 2009 to 2014, nonischemic cardiomyopathy was the dominant underlying primary diagnosis among patients 18 to 39 years (64%) and 40 to 59 years (51%) undergoing transplant operations. Ischemic cardiomyopathy was the dominant underlying primary diagnosis among the heart transplant recipients 60 to 69 years (50%) and 70 years and older (55%). Overall, ischemic cardiomyopathy is the underlying heart failure diagnosis in approximately 40% of men and 20% of women who receive a transplant. Approximately 3% of the heart transplants during this time period were in adults with congenital heart disease.

**Treatment**

Innovations in medical and device therapy for patients with advanced heart failure have improved the survival of patients awaiting heart transplantation. The demand for heart transplants far exceeds the availability of donor organs, and the length of time patients are on the waiting list for transplants has increased. According to data from the Organ Procurement and Transplantation Network, in 2017, a total of 3244 heart transplants were performed in the U. S. As of July 2018, there were 4003 patients on the waiting list for a heart transplant. The chronic shortage of donor hearts has led to the prioritization of patients awaiting transplantation to ensure greater access for patients most likely to derive benefit. Prioritization criteria are issued by the Organ Procurement and Transplantation Network and fulfilled through a contract with the United Network for Organ Sharing.

From 2008 to 2015, approximately 4% of heart transplants were repeated transplantations. Heart retransplantation raises ethical issues due to the lack of sufficient donor hearts for initial transplants. The United Network for Organ Sharing does not have separate organ allocation criteria for repeat heart transplant recipients.

**Prioritization of Candidates**

Most heart transplant recipients now are hospitalized as status 1 patients at the time of transplant. This shift has occurred due to the increasing demand for the scarce resource of donor organs resulting in increased waiting time for recipients. Patients initially listed as status 2 candidates may deteriorate to a status 1 candidate before a donor organ becomes available. Alternatively, as medical and device therapy for advanced heart failure improves, some patients on the transplant list will recover enough function to be delisted. Lietz and Miller (2007) reported on survival for patients on the heart transplant waiting list, comparing the era between 1990 and 1994 with the era of 2000 to 2005. One-year survival for United Network for Organ Sharing status 1 candidate improved from 49.5% to 69.0%. Status 2 candidates fared even better, with 89.4% surviving 1 year compared with 81.8% in the earlier time period.

Johnson et al (2010) reported on waiting list trends in the U. S. between 1999 and 2008. The proportion of patients listed as status 1 increased, even as the waiting list and posttransplant mortality for this group have decreased. Meanwhile, status 2 patients have decreased as a proportion of all candidates. Completed transplants have trended toward the extremes of age, with more infants and patients older than age 65 years having transplants in recent years.

As a consequence, aggressive treatment of heart failure has been emphasized in recent guidelines. Prognostic criteria have been investigated to identify patients who have truly exhausted medical therapy and thus are likely to derive the maximum benefit for heart transplantation. Maximal oxygen consumption ($V_{O2\text{max}}$), which is measured during maximal exercise, is a measure suggested as a critical objective criterion of the functional reserve of the heart. The American College of Cardiology and American Heart Association have adopted $V_{O2\text{max}}$ as a criterion for patient selection. Studies have suggested that transplantation can be safely deferred in those patients with a $V_{O2\text{max}}$ of greater than 14 mL/kg/min. The importance of the $V_{O2\text{max}}$ has also been emphasized by the American Heart Association when addressing heart transplant candidacy. In past years, a left ventricular ejection fraction of less than 20% or a New York Heart Association class III or IV status might have been used to determine transplant candidacy. However, as indicated by the American College of Cardiology criteria, these measurements are no longer considered adequate to identify transplant candidates. These measurements may be used to identify patients for further cardiovascular workup but should not be the sole criteria for transplant.
Methods other than VO\textsubscript{2max} have been proposed as predictive models in adults\textsuperscript{9,10,11,12}. The Heart Failure Survival Scale and the Seattle Heart Failure Model (SHFM) are examples. In particular, the SHFM provides an estimate of 1-, 2-, and 3-year survival with the use of routinely obtained clinical and laboratory data. Information on pharmacologic and device usage is incorporated into the model, permitting some estimation on the effects of current, more aggressive heart failure treatment strategies. Levy et al (2006) introduced the model using a multivariate analysis of data from the Prospective Randomized Amlodipine Survival Evaluation-1 heart failure trial (n=1125).\textsuperscript{13} Applied to the data of 5 other heart failure trials, SHFM correlated well with actual survival ($r=0.98$). SHFM has been validated in both ambulatory and hospitalized heart failure populations,\textsuperscript{14,15,16} but with a noted underestimation of mortality risk, particularly in blacks and device recipients.\textsuperscript{17,18} None of these models has been universally adopted by transplant centers.

**Summary**

A heart transplant and a retransplant consists of replacing a diseased heart with a healthy donor heart. Transplantation is used for patients with refractory end-stage cardiac disease.

For individuals who have end-stage heart failure who receive a heart transplant, the evidence includes case series and registry data. The relevant outcomes are overall survival, symptoms, morbid events, and treatment-related morbidity and mortality. Heart transplant remains a viable treatment for those with severe heart dysfunction despite appropriate medical management with medication, surgery, or medical devices. Given the exceedingly poor survival rates without transplantation for these patients, evidence of posttransplant survival is sufficient to demonstrate that heart transplantation provides a survival benefit. Heart transplantation is contraindicated for patients for whom the procedure is expected to be futile due to comorbid disease or for whom posttransplantation care is expected to worsen comorbid conditions significantly. The evidence is sufficient to determine that the technology results in a meaningful improvement in the net health outcome.

For individuals who have had a prior heart transplant complicated by graft failure or severe dysfunction of the heart who receive a heart retransplant, the evidence includes case series and registry data. The relevant outcomes are overall survival, symptoms, morbid events, and treatment-related morbidity and mortality. Despite improvements in the prognosis for many patients with graft failure, cardiac allograft vasculopathy, and severe dysfunction of the transplanted heart, heart retransplant remains a viable treatment for those whose severe symptoms persist despite treatment with other medical or surgical remedies. Given the exceedingly poor survival rates without retransplantation for patients who have exhausted other treatments, evidence of posttransplant survival is sufficient to demonstrate that heart retransplantation provides a survival benefit in appropriately selected patients. The evidence is sufficient to determine that the technology results in a meaningful improvement in the net health outcome.

**Policy History**

<table>
<thead>
<tr>
<th>Date</th>
<th>Action</th>
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<tr>
<td>2/2018</td>
<td>Clarified coding information.</td>
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<tr>
<td>11/2017</td>
<td>New references added from BCBSA National medical policy.</td>
</tr>
<tr>
<td>1/2016</td>
<td>New references added from BCBSA National medical policy.</td>
</tr>
<tr>
<td>11/2015</td>
<td>Added coding language.</td>
</tr>
<tr>
<td>12/2014</td>
<td>New references added to BCBSA National medical policy.</td>
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<tr>
<td>6/2014</td>
<td>Updated Coding section with ICD10 procedure and diagnosis codes, effective 10/2015.</td>
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12/2013  Removed ICD-9 diagnosis codes as this policy requires prior authorization


3/22/2011  Clarified medical necessity criteria based on revision of the BCBSA policy.


5/20/2010  Updated to clarify and reword when services are not covered section. No changes to policy statement.

3/2010  National Policy Review # 7.03.09. Revision to policy statement.

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

References


60. Canter CE, Shaddy RE, Bernstein D, et al. Indications for heart transplantation in pediatric heart disease: a scientific statement from the American Heart Association Council on Cardiovascular Disease in the Young; the Councils on Clinical Cardiology, Cardiovascular Nursing, and Cardiovascular Surgery and Anesthesia; and the Quality of Care and Outcomes Research Interdisciplinary Working Group. *Circulation.* Feb 6 2007;115(5):658-676. PMID 17261651