

# Molina Clinical Policy

## Heart Transplantation with a Total Artificial Heart (TAH):

### Policy No. 245

Last Approval: 10/12/2023

Next Review Due By: October 2024



## DISCLAIMER

This Molina Clinical Policy (MCP) is intended to facilitate the Utilization Management process. Policies are not a supplementation or recommendation for treatment; Providers are solely responsible for the diagnosis, treatment, and clinical recommendations for the Member. It expresses Molina's determination as to whether certain services or supplies are medically necessary, experimental, investigational, or cosmetic for purposes of determining appropriateness of payment. The conclusion that a particular service or supply is medically necessary does not constitute a representation or warranty that this service or supply is covered (e.g., will be paid for by Molina) for a particular Member. The Member's benefit plan determines coverage – each benefit plan defines which services are covered, which are excluded, and which are subject to dollar caps or other limits. Members and their Providers will need to consult the Member's benefit plan to determine if there are any exclusion(s) or other benefit limitations applicable to this service or supply. If there is a discrepancy between this policy and a Member's plan of benefits, the benefits plan will govern. In addition, coverage may be mandated by applicable legal requirements of a State, the Federal government or CMS for Medicare and Medicaid Members. CMS's Coverage Database can be found on the CMS website. The coverage directive(s) and criteria from an existing National Coverage Determination (NCD) or Local Coverage Determination (LCD) will supersede the contents of this MCP and provide the directive for all Medicare members. References included were accurate at the time of policy approval and publication.

## OVERVIEW

A **temporary total artificial heart (TAH-t)** is an implantable, pneumatic, biventricular support device that provides a total replacement for both ventricles of the failing heart. The implantation of a total artificial heart is used as a bridge to transplantation measure in patients with end-stage heart failure who meet standard, accepted criteria for heart transplantation, are at imminent risk of death with no other treatment options, and for whom a compatible donor heart is unavailable.

### Regulatory Status

The SynCardia temporary Total Artificial Heart TAH-t, formerly referred to as the CardioWest™ Total Artificial Heart, is the only FDA-approved device for a bridge to transplant in cardiac transplant-eligible candidates at risk of imminent death from biventricular failure, intended and approved for use inside the hospital. The SynCardia Freedom® Driver System received FDA approval as a supplement to the original approval on June 26, 2014. The device is marketed under the trade name SynCardia Temporary Total Artificial Heart with the Freedom Driver System; it is indicated for use as a bridge to transplantation in cardiac transplant candidates who have been implanted with the temporary Total Artificial Heart (TAH-t) and are clinically stable. SynCardia's temporary TAH-t system is regulated by the FDA under the product code LOZ in the Premarket Approval database.

## COVERAGE POLICY

**All transplants require prior authorization from the Corporate Transplant Department. Solid organ transplant requests will be reviewed by the Corporate Senior Medical Director or qualified clinical designee. All other transplants will be reviewed by the Corporate Senior Medical Director or covering Medical Director. If the criteria are met using appropriate NCD and/or LCD guidelines, State regulations, and/or MCP policies the Corporate Senior Medical Director's designee can approve the requested transplant.**

*Office visits with participating Providers do NOT require prior authorization. Providers should see the Member in office visits as soon as possible and without delay. Failure to see the Member in office visits may be considered a serious quality of care concern.*

### Transplant Evaluation

**Please see *MCP-323 Pre-Transplant Evaluation* for additional criteria and information.**

Components of transplant evaluation include:

1. History and physical examination; **AND**
2. Psychosocial evaluation and clearance:
  - a. Absence of any history of medical treatment non-compliance; **AND**

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- b. Member understands surgical risk and post procedure follow-up required; **AND**
- c. Adequate family and social support; **AND**
- d. No behavioral health disorders or psychosocial issues:
  - i. If history of behavioral health disorder, no severe psychosis or personality disorder may be present;
  - ii. Mood/anxiety disorder must be excluded, unless actively treated and controlled

**AND**

- 3. EKG; **AND**
- 4. Chest x-ray; **AND**
- 5. Cardiac clearance in the presence of any of the following:
  - a. Chronic smokers; **OR**
  - b. Members > 50 years age; **OR**
  - c. Those with a clinical or family history of heart disease or diabetes.

**AND**

- 6. Pulmonary clearance if evidence of pulmonary artery hypertension or chronic pulmonary disease; **AND**
- 7. Neurological exam and clearance for transplant including **ONE** of the following:
  - a. Normal neurological exam; **OR**
  - b. Non-life limiting neurological impairment that does not preclude transplant and not caused by hematologic malignancy (e.g., diabetic peripheral neuropathy); **OR**
  - c. Abnormal neurological exam with positive findings including **ONE** of the following:
    - i. Lumbar puncture normal cytology; **OR**
    - ii. Lumbar puncture with cytological exam abnormal, with central nervous system disease treated prior to clearance.

**AND**

- 8. A Performance Status that includes **ONE** of the following:
  - a. Karnofsky score 70-100%; **OR**
  - b. Eastern Cooperative Oncology Group (ECOG) Grade 0-2.

**AND**

- 9. Lab studies that include:
  - a. Complete blood count; kidney profile (blood urea nitrogen, creatinine); electrolytes; calcium; phosphorous; albumin; liver function tests; and coagulation profile (prothrombin time, and partial thromboplastin time);\*
  - b. Serologic screening for: Human immunodeficiency virus (HIV); Epstein Barr virus; Hepatitis B virus; Hepatitis C virus; cytomegalovirus; rapid plasma reagin and/or fluorescent treponemal antibody:\*.
    - If HIV positive **ALL** of the following must be met:
      - i. CD4 count >200 cells/mm-3 for >6 months; **AND**
      - ii. Human immunodeficiency 1 (HIV-1) ribonucleic acid undetectable; **AND**
      - iii. On stable anti-retroviral therapy >3 months; **AND**
      - iv. No other complications from acquired immunodeficiency syndrome (AIDS) (e.g., opportunistic infection, including aspergillus, tuberculosis, coccidioides mycosis, resistant fungal infections, Kaposi's sarcoma, or other neoplasm).
  - c. Urine drug screen if Member has a history of and/or current drug abuse.

**AND**

- 10. Colonoscopy (if indicated or if Member is age  $\geq$  45) with complete workup and treatment of abnormal results as indicated; an initial screening colonoscopy after initial negative screening requires a follow-up colonoscopy every 10 years)\* ;**AND**

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11. Gynecological examination with Pap smear for women ages  $\geq 21$  to  $\leq 65$  years of age or if indicated (not indicated in women who have had a total abdominal hysterectomy or a total vaginal hysterectomy) within the last three years with complete workup and treatment of abnormal results as indicated\*; **AND**
12. Dental examination or oral exam showing good dentition and oral care or no abnormality on panorex or plan for treatment of problems pre- or post-transplant within the last 12 months; **AND**
13. Mammogram (if indicated or  $>$  age 40) with complete workup and treatment of abnormal results as indicated\*;

**OR**

14. Prostate Specific Antigen, if history of prostate cancer or previously elevated prostate specific antigen with complete workup and treatment of abnormal results as indicated\*.

\* Participating Centers of Excellence may waive these criteria.

**Criteria for SynCardia Temporary Artificial Heart (TAH-t) System**

The SynCardia temporary Total Artificial Heart (TAH-t) System **may be considered medically necessary** as a bridge to heart transplantation for individuals who have no other reasonable medical or surgical treatment options, who are ineligible for other univentricular or biventricular support devices, and who meet **ALL** of the following criteria:

1. Must be used in accordance with FDA approval; **AND**
2. Eligible and listed for donor organ heart transplantation and meet all of the heart transplant criteria in *MCP-116 Heart Transplantation*; **AND**
3. Member is in imminent danger of dying within 48 hours or at risk of becoming ineligible for transplant; **AND**
4. Meet the criteria of New York Heart Association Functional Class IV\*\*; **AND**
5. Member has a diagnosis of biventricular failure and rapid decompensation; **AND**
6. Unavailability of heart donor and likelihood that Member's condition will deteriorate before a donor can be identified; **AND**
7. Absence of **ALL** the following absolute contraindications for artificial heart transplantation:
  - a. Ineligible for donor heart transplant; **AND**
  - b. Insufficient space in the chest area vacated by the native ventricles. Generally, this includes individuals who have body surface areas less than 1.8 m<sup>2</sup>, or who have a distance between the sternum and the 10th anterior vertebral body measured by computed tomography imaging (CT scan) less than 10 cm.; **AND**
  - c. Inability to be adequately anticoagulated on the SynCardia temporary Total Artificial Heart (TAH-t) System and/or thrombophilia; **AND**
  - d. Active pregnancy if female; **AND**
  - e. Active, untreated substance abuse or misuse (including significant and/or daily cannabis use) requires formal substance use disorder evaluation with clear and unambiguous documentation of:
    - i. A reasonable expectation that the member can adequately comply with a complex, post-transplant plan of care; **AND**
    - ii. The member is free from addiction for at least 6 months.

\*\*Class IV: Unable to carry on any physical activity without discomfort. Symptoms of heart failure at rest. If any physical activity is undertaken, discomfort increases.

**Limitations and Exclusions**

The SynCardia temporary Total Artificial Heart (TAH-t) System **is considered experimental, investigational, and unproven** for permanent use as destination therapy.

**DOCUMENTATION REQUIREMENTS.** Molina Healthcare reserves the right to require that additional documentation be made available as part of its coverage determination; quality improvement; and fraud; waste and abuse prevention processes. Documentation required may include, but is not limited to, patient records, test results and credentials of the provider ordering or performing a drug or service. Molina Healthcare may deny reimbursement or take additional appropriate action if the documentation provided does not support the initial determination that the drugs or services were medically necessary, not investigational, or experimental, and otherwise within the scope of benefits afforded to the member, and/or the documentation demonstrates a pattern of billing or other practice that is inappropriate or excessive.

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**SUMMARY OF MEDICAL EVIDENCE**

Itagaki et al. (2022) queried the United Network of Organ Sharing Standard Transplant Research File between 2005 and 2018 for data from total artificial heart transplants and ran the data through multivariable Cox regression models for risk prediction. The data revealed a total of 471 patients underwent total artificial heart implantation. The 6-month cumulative incidence of mortality on the total artificial heart was 24.6%, paired with a 49% 6-month cumulative incidence of heart transplant. Of 161 transplant centers, 11 centers had cumulative volume of 10 or more implants. Cumulative center volume less than 10 implants were predictive of both mortality on the total artificial heart (hazard ratio, 2.2, 95% confidence interval, 1.5-3.1,  $P < .001$ ) and post-transplant mortality after a total artificial heart bridge (hazard ratio, 1.5, 95% confidence interval, 1.0-2.2,  $P = .039$ ). In summation the data indicated total artificial heart is a viable bridge to heart transplantation, especially in higher volume centers. The revelation of inferior outcomes in lower volume centers indicates targeted training, center certifications, and minimum volume requirements could improve outcomes for patients requiring the total artificial heart.

Chen et al. (2022) queried the United Network of Organ Sharing Standard Transplant Research File between 2005 and 2020 to compare the 392 adults who underwent heart transplantation after receiving the total artificial heart as a bridge treatment (TAH-t BTT) against 11,014 durable left ventricular assist device bridge to transplantation (LVAD BTT) patients and 22,348 de novo heart transplants during the same period in the United States. The data revealed that patients who received TAH-t BTT patients had increased dialysis dependence compared to LVAD BTT and de novo transplants (24.7% vs. 2.7% vs. 3.8%) and higher levels of baseline creatinine and total bilirubin (all  $p < .001$ ). After heart transplantation, TAH-t BTT patients were more likely to die from multiorgan failure in the first year (25.0% vs. 16.1% vs. 16.1%,  $p = .04$ ); however, of those who survived the first year post transplant the 10-year survival rate was similar across the board (TAH-t BTT 66.8%, LVAD BTT 68.7%, De Novo 69.0%, all  $p > .20$ ). Among TAH-t BTT patients, predictors of 1-year mortality included higher baseline creatinine and total bilirubin, mechanical ventilation, and cumulative center volume  $< 20$  cases of heart transplantation involving TAH-t BTT (all  $p < .05$ ). TAH-t BTT survival rates are acceptable, better at higher volume centers, and the patients who survive the first-year post heart transplantation face similar mortality risks over time when compared to LVAD BTT and de novo heart transplant recipients.

Carrier et al. (2021) conducted a retrospective analysis of 217 consecutive patients who received total artificial heart transplants as a bridge to heart transplantation from 2014 – 2019 in six high volume North American centers. Of the 217 total artificial heart transplants 138 underwent heart transplant, while 75 (34.5%) died before they could receive a heart transplant. The mean time between total artificial heart transplant and heart transplant averaged  $181 \pm 179$  days (range: 0-849) and the mean follow-up after heart transplant was  $35 \pm 25$  months. The overall survival in the entire cohort was 75%, 64%, and 58% at 1, 2, and 5 years, respectively. Post-transplant survival was 88%, 84%, 79%, and 74% at 6 months, 1 year, 2 years, and 5 years, respectively. In summation, almost two thirds of those who received a total artificial heart could be transplanted with overall and post heart transplantation satisfactory survival rates.

Morshuis et al. (2020) conducted a retrospective analysis of 193 patients who received a total artificial heart as a bridge to transplantation (TAH-t BTT) at a high-volume German center from 2001 – 2019. The 69 TAH-t BTT patients who received heart transplants were compared to 393 left ventricular assist device bridge to transplantation (LVAD BTT), 70 biventricular assist device bridge to transplantation (BVAD BTT), and 876 de novo heart transplantation conducted at the same center. Total survival rates after heart transplantation were 43.5% for TAH-t BTT, 60% for BVAD BTT, 61.1% for LVAD BTT, and 60% for de novo heart transplants; however, the highest mortality rates for TAH-t BTT happened within one year post heart transplant, of those that survived the first year the survival rates were not significantly different from all other post-transplant survival rates. The authors offered possible reasons for the significant difference in the first year mortality of TAH-t BTT patients including significantly increased adhesions due to the device, prolonged surgical preparation times leading to prolonged cold and warm ischemic times, and the inability to completely evaluate SynCardia TAH patients for transplantation due to the device not allowing for certain measurements such as pulmonary artery pressures and such, thus possibly covering up underlying significant vascular disease prior to transplantation. All of these potential factors kept in mind, the authors concluded that TAH-t BTT is a viable option for some patients when vigorous risk assessments are made on a case-by-case basis.

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#### CODING & BILLING INFORMATION

##### CPT (Current Procedural Terminology) Codes

CPT	Description
33927	Implantation of a total replacement heart system (artificial heart) with recipient cardiectomy
33928	Removal and replacement of total replacement heart system (artificial heart)
33929	Removal of a total replacement heart system (artificial heart) for heart transplantation (list separately in addition to code for primary procedure)

**CODING DISCLAIMER.** Codes listed in this policy are for reference purposes only and may not be all-inclusive. Deleted codes and codes which are not effective at the time the service is rendered may not be eligible for reimbursement. Listing of a service or device code in this policy does not guarantee coverage. Coverage is determined by the benefit document. Molina adheres to Current Procedural Terminology (CPT®), a registered trademark of the American Medical Association (AMA). All CPT codes and descriptions are copyrighted by the AMA; this information is included for informational purposes only. Providers and facilities are expected to utilize industry standard coding practices for all submissions. When improper billing and coding is not followed, Molina has the right to reject/deny the claim and recover claim payment(s). Due to changing industry practices, Molina reserves the right to revise this policy as needed.

#### APPROVAL HISTORY

10/12/2023	Policy reviewed, changes to criteria include age for colonoscopy reduced to 45 years, addition of non-life limiting neurological impairment criteria, removal of abnormal serology criteria and cannabis use section, and addition of active pregnancy and substance abuse statement to absolute contraindications. Overview, Summary of Medical Evidence, and References sections updated. IRO peer reviewed by a practicing physician board certified in cardiology August 2023.
10/12/2022	Policy reviewed, no changes to criteria, included section on marijuana use; updated Coding section.
10/13/2021	Policy reviewed, no changes to criteria, updated references.
09/16/2020	Policy reviewed, no changes to criteria, updated references.
09/18/2019	Policy reviewed, no changes to criteria, updated references.
03/08/2018	Updated exclusions to include the SynCardia TAH-t System for permanent use as destination therapy; professional guidelines and references updated.
06/22/2017	Policy reviewed, no changes to criteria, updated references.
09/15/2016	Policy reviewed, no changes to criteria, updated references.
12/16/2015	Policy reviewed, no changes to criteria, updated references.
04/06/2015	New policy.

#### REFERENCES

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