

# Clinical Policy: Implantable Wireless Pulmonary Artery Pressure Monitoring

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Coding ImplicationsRevision Log

## Description

Various cardiac hemodynamic monitoring techniques have been investigated as a means to remotely guide outpatient heart failure (HF) therapy, including implantable wireless pulmonary artery (PA) pressure monitoring (e.g., CardioMEMS®).<sup>1</sup> The implanted device measures and monitors daily PA pressure. The data is used by physicians for heart failure management with the goal of reducing heart failure hospitalizations.<sup>2</sup> Currently, only CardioMEMS has FDA approval, and other devices (e.g. Chronicle®, ImPressure®) that monitor cardiac output through measurements of pressure changes in the pulmonary artery or right ventricular outflow tract are not supported by current evidence.<sup>3</sup>

## Policy/Criteria

- I. It is the policy of PA Health & Wellness® (PHW) that the long-term safety and effectiveness of implantable wireless pulmonary artery pressure monitoring has not been proven for any indication, including the management of heart failure.

## Background

Heart failure (HF) is one of the most common causes of hospitalization and readmission.<sup>2,4</sup> According to the Centers for Disease Control, an estimated 5.7 million adults in the United States have HF. HF is a complex clinical syndrome that results from any structural or functional impairment of ventricular filling or ejection of blood.<sup>5</sup> The primary manifestations of HF are dyspnea and fatigue, which may limit exercise tolerance, and fluid retention, which may lead to pulmonary and/or splanchnic congestion and/or peripheral edema.<sup>6-7</sup> The classification system most commonly used to quantify the degree of functional limitation caused by HF is the New York Heart Association Functional Classification system (NYHA).<sup>7</sup> This system assigns patients to one of four functional classes, depending on the degree of effort needed to elicit symptoms.<sup>7</sup>

Accurate monitoring of HF patients for exacerbations is important in an effort to reduce recurrent hospitalizations and associated complications.<sup>5,8</sup> Strategies to reduce hospitalizations in patients with HF include optimizing evidence-based drug and device therapies, addressing causes of HF, treating comorbidities, and improving management of care.<sup>9</sup> It is proposed that monitoring changes in pulmonary artery (PA) pressure (i.e., pressure the heart must exert to pump blood from the heart through the arteries of the lungs) may provide a way to monitor changes in HF resulting in improved HF management.<sup>2</sup>

The CardioMEMS HF System (St. Jude Medical) is Food and Drug Administration (FDA) approved for wirelessly measuring and monitoring pulmonary artery pressure and heart rate in NYHA Class III heart failure patients who have been hospitalized for heart failure in the previous year.<sup>2-3</sup> The hemodynamic data is used by physicians for heart failure management with the goal of reducing hospitalizations related to heart failure.<sup>8</sup>

The CardioMEMS HF system provides daily PA pressure measurements, including systolic, diastolic, and mean PA pressures.<sup>1</sup> The system includes a dime sized PA sensor that is permanently implanted in the pulmonary artery via fluoroscopy-guided right-heart catheterization, a transvenous catheter delivery system, a patient home monitoring electronic system, and a secure internet-accessible database that allows clinicians to access patient data.<sup>8,10</sup> The home monitoring components include a pillow containing the antenna to capture the sensor reading, a bedside monitoring unit to which the pillow is connected via a cable, and a remote button. Each reading captures 18 seconds of pressure data that is wirelessly transmitted to a secure database. The patient's physician can use this information to optimize medical management and potentially reduce the need for HF-related hospitalizations.<sup>2</sup> The CardioMEMS HF System is contraindicated for patients with an inability to take dual antiplatelet or anticoagulants for one month post implant.

Sponsored by the manufacturer, the largest randomized single-blind trial, the Champion Trial (CardioMEMS Heart Sensor Allows Monitoring of Pressure to Improve Outcomes In NYHA Class III Heart Failure Patients), reported that transmission of PA pressure data from the device reduced HF-related hospitalizations at six months (31% versus 44%).<sup>2,11-12</sup> A later analysis reported sustained reduction in HF-related hospitalization in the device-guided management group compared with the control at 18-month average follow-up (46% versus 68%).<sup>14</sup> During a subsequent open access period with a mean duration of 13 months, pulmonary artery pressure information was made available to guide therapy in the former control group. The rate of admission was reduced compared with that in the control group during the randomized access period (36% versus 68%). The rate of device-related or system-related complications was 1%, which was also the rate of procedure-related adverse events. However, concerns were raised by the FDA regarding potential influence of the sponsor during the randomization period in this study.<sup>12,15-16</sup> In addition, study limitations include the lack of power to perform mortality analyses, lack of baseline quality-of-life data, and potential for sponsor to influence patient management.<sup>15</sup>

At this time, the current evidence is insufficient to support the use of ambulatory cardiac hemodynamic monitoring using an implantable pulmonary artery pressure measurement device in individuals with heart failure in an outpatient setting. Data on long-term health benefits (including survival), safety issues, and quality of life are lacking. In addition, there is a lack of evidence on the accuracy and clinical utility of the device for use in other NYHA functional classifications.

#### *American College of Cardiology Foundation*

The American College of Cardiology Foundation/American Heart Association (ACCF/AHA) 2022 Guideline for the Management of Heart Failure in Adults recommend monitoring with a pulmonary artery catheter in patients with respiratory distress or impaired systemic perfusion when clinical assessment is inadequate.<sup>6</sup> In addition, invasive hemodynamic monitoring can be beneficial in certain patients with acute HF with persistent symptoms and/or when hemodynamics are uncertain.<sup>6</sup>

The ACCF/AHA guidelines do not specifically address outpatient wireless implantable pulmonary artery pressure monitoring; however, they note, "There has been no established role

for routine or periodic invasive hemodynamic measurements in the management of HF. Most drugs used for the treatment of HF are prescribed on the basis of their ability to improve symptoms or survival rather than their effect on hemodynamic variables. The initial and target doses of these drugs are generally selected on the basis of controlled trial experience rather than changes produced in cardiac output or pulmonary capillary wedge pressure.”<sup>6</sup>

#### *European Society of Cardiology*

According to the European Society of Cardiology (ESC), monitoring of pulmonary artery pressures using a wireless implantable hemodynamic monitoring system (CardioMEMS) may be considered in symptomatic patients with HF with previous HF hospitalization in order to reduce the risk of recurrent HF hospitalization.<sup>17</sup> This recommendation from ESC is considered a Class IIB, level B recommendation (i.e., usefulness/efficacy is less well established by evidence/opinion, and data has been derived from a single randomized clinical trial or large non-randomized studies).<sup>17</sup>

#### *National Institute for Health and Care Excellence (NICE)*

Current evidence on the safety and efficacy of the insertion and use of implantable pulmonary artery pressure monitors in chronic heart failure is limited in both quality and quantity. Therefore, this procedure should only be used with special arrangements for clinical governance, consent and audit or research.<sup>17</sup>

#### **Coding Implications**

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CPT® Codes	Description
33289	Transcatheter implantation of wireless pulmonary artery pressure sensor for long-term hemodynamic monitoring, including deployment and calibration of the sensor, right heart catheterization, selective pulmonary catheterization, radiological supervision and interpretation, and pulmonary artery angiography, when performed
93264	Remote monitoring of a wireless pulmonary artery pressure sensor for up to 30 days, including at least weekly downloads of pulmonary artery pressure recordings, interpretation(s), trend analysis, and report(s) by a physician or other qualified health care professional

HCPCS Codes	Description
C2624	Implantable wireless pulmonary artery pressure sensor with delivery catheter, including all system components

Reviews, Revisions, and Approvals	Revision Date	Approval Date
Policy developed	05/18	
Updated background information. References and codes reviewed and updated. Specialist reviewed.	10/19	
Revised policy statement from “not medically necessary” to “investigational.” References and codes reviewed and updated. Specialist reviewed.	10/2020	12/2020
“Experimental/investigational” verbiage replaced in policy statement with descriptive language. All instances of “member” changed to member/enrollee. References reviewed and updated. Specialist reviewed.	7/2021	
Annual review. Description and background updated with no impact on criteria. References reviewed and updated. Changed “last review date” in the header to “date of last revision” and changed “date” in the revision log header to “revision date.” Specialist reviewed.	8/31/2022	
Ad Hoc review. Background updated with no clinical impact. ICD-10 Codes removed. References reviewed and updated.	04/23	

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