Atrial Fibrillation

Clinical Guidelines for Medical Necessity Review

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Important Notices

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Other Notices:

Guideline Information:

Disease Area: Cardiology
Care Path Group: Arrhythmias
Care Path Name: Atrial Fibrillation
Type: [**X**] Adult (18+ yo) | [_] Pediatric (0-17yo)

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Care Path Overview

Care Path Clinical Discussion

Atrial fibrillation (AF) is a supraventricular arrhythmia involving extremely rapid and disorganized electrical activity that negatively impacts cardiac function. Atrial fibrillation can cause or worsen pre-existing heart failure and increase mortality in patients with myocardial infarction.[1] Atrial fibrillation is associated with a fivefold increased risk of stroke. It is the most common arrhythmia overall and is more common with increasing age.[1]

Confirm suspected atrial fibrillation with 12-lead electrocardiography (ECG).[2] If the patient has a normal ECG and atrial fibrillation is still suspected, home monitoring is recommended. In patients with a transient ischemic attack (TIA) or ischemic stroke (particularly thromboembolic), screen for AF with short-term ECG monitoring followed by continuous ECG monitoring for at least 72 hours. In stroke patients, long-term non-invasive ECG monitors or implantable cardiac monitors may be appropriate.[3]

Following the initial assessment, the two primary treatment goals are to prevent thromboembolism or stroke and control symptoms with rhythm or rate control.[3]

Anticoagulation reduces the risk of stroke but increases the risk of bleeding. In patients with nonvalvular atrial fibrillation, the CHA_2DS_2-VASc score is recommended for assessment of stroke risk. For patients with atrial fibrillation who have mechanical heart valves, warfarin is recommended, and the target international normalized ratio (INR) intensity (2.0 to 3.0 or 2.5 to 3.5) should be based on the type and location of the prosthesis. Oral anticoagulation reduces the risk of stroke in patients with atrial fibrillation and a CHA_2DS_2-VASc score greater than or equal to two in men or greater than or equal to three in women. Consider use in patients with a CHA2DS2-VASc score of one in men or two in women.[4] The HAS-BLED score estimates the risk of bleeding. Scores of three or greater indicate a high-risk of bleeding. Options for stroke prevention include warfarin, dabigatran (direct thrombin inhibitor), factor Xa inhibitors (e.g., rivaroxaban, apixaban, edoxaban), and aspirin. The selection of therapy should be individualized based on the patient's risks and potential benefits.[1]

The second goal for patients with established atrial fibrillation is either rate control therapy to moderate the heart rate for symptom improvement or to utilize rhythm control strategies to re-establish normal sinus rhythm (cardioversion or transcatheter ablation). Rate control therapy should be

individualized based on hemodynamic status, comorbidities, duration of atrial fibrillation, and ejection fraction.[3] Rate control therapy typically involves beta-blockers or non-dihydropyridine calcium channel blockers. Digoxin may be considered in those with severe LV dysfunction and HF or hemodynamic instability. Lenient rate control (heart rate less than 110) is often enough to improve symptoms from atrial fibrillation but varies per the needs of each patient.

The primary indication for rhythm control is reducing AF-related symptoms, preventing arrhythmia-induced cardiomyopathy, and improving quality of life.[4] Options for rhythm control include pharmacological antiarrhythmics (e.g., flecainide, propafenone, or amiodarone), synchronized electrical cardioversion, and catheter ablation.

In hemodynamically unstable patients, emergency electrical cardioversion may be indicated.[1] The main indication for cardioversion is unstable or poorly tolerated paroxysmal or persistent atrial fibrillation. Under all elective circumstances, an interval of pre-cardioversion anticoagulation is recommended. Unless done emergently, or when the duration of the arrhythmia is less than 48 hours in a patient with a low CHA_2DS_2-VASc score, at least four weeks of pre- and post-cardioversion anticoagulation at therapeutic doses is needed. Transesophageal echocardiography may be helpful to lower the risk of cardioversion under all circumstances if an interval of anticoagulation is not clinically reasonable.

Atrioventricular node ablation with pacemaker implantation may be beneficial as a palliative approach for rate control of longstanding AF. Certain patients with tachycardia-induced cardiomyopathy or with refractory ventricular rate control despite maximal medical therapy can benefit from this procedure.[5] In patients with a tachycardia-induced cardiomyopathy, catheter ablation of the AV node often reverses left ventricular dysfunction.[4] Long-term anticoagulation is still required following this procedure.[1]

Catheter ablation of atrial fibrillation is a well-established treatment option.[3,5,6] Catheter ablation is recommended in patients with symptomatic atrial fibrillation and desire rhythm control. The most robust consensus in favor of ablation is for those patients refractory or intolerant to antiarrhythmic medication, particularly Class I or Class III antiarrhythmics.[5] Success rates are much higher in paroxysmal or persistent atrial fibrillation than in permanent atrial fibrillation, the latter of which often is associated with a dilated left atrium. The goal of the procedure is to electrically isolate the areas of the left atrium where fibrillation circuits originate, usually around or inside the pulmonary veins, usually with either radiofrequency or cryothermic energy.

Open surgical treatments for atrial fibrillation are high-risk and usually are reserved for those undergoing cardiac surgery for other indications.[1] There are now transcatheter implantable left atrial appendage occlusion devices (such as the WATCHMAN Device and the Amulet device) approved for mitigating the risk of stroke in patients with atrial fibrillation.[6,7] Most patients who are candidates for these devices are those who have had major bleeding events from medical anticoagulation regimens and must have a CHA_2DS_2-VASc score of 3 or greater as prescribed by CMS.[8]

The information contained herein gives a general overview of the pathway of this specific diagnosis, beginning with an initial presentation, recommended assessments, and treatment options as supported by the medical literature and existing guidelines. It should be noted that the care of patients can be complex. The information below is meant to support clinical decision-making in adult patients. It is not necessarily applicable to every case, as the entire clinical picture (including comorbidities, history, etc.) should be considered.

Key Information

- Patients with atrial fibrillation may be asymptomatic or present with mild or severe signs and symptoms. This can include stroke, heart failure, or hemodynamic collapse.[1]
- Atrial fibrillation is the most common type of cardiac arrhythmia. The prevalence of atrial fibrillation increases with age, affecting about 3% of men and 2% of women aged 65 to 69 years, and about 10% of adults 85 years and older.[2]
- Confirm suspected atrial fibrillation with 12-lead electrocardiography. When clinical suspicion of atrial fibrillation persists despite normal electrocardiography results, a Holter monitor or event monitor may be needed.[1]
- Oral anticoagulation reduces the risk of stroke in patients with atrial fibrillation and a CHA_2DS_2-VASc score greater than or equal to two in men or greater than or equal to three in women. It "should be considered" in patients with a CHA_2DS_2-VASc score of one in men or two in women.[4] The HAS-BLED score estimates the risk of bleeding. Scores of three or greater indicate a high-risk of bleeding.
- In patients with a transient ischemic attack (TIA) or ischemic stroke, screening for AF is recommended by short-term ECG monitoring followed by continuous ECG monitoring for at least 72 hours.
- Catheter ablation of atrial fibrillation has become a much more common procedure and is recommended to re-establish normal sinus rhythm after the failure of medical therapy.
- Surgical treatments for atrial fibrillation are high-risk and, therefore, should be considered only in patients undergoing cardiac surgery for other reasons.[6]

Definitions

- **CHA_2DS_2-VASc Score:** A composite score of clinical factors to predict future stroke risk in patients with non-valvular atrial fibrillation. Points are assigned for the presence of comorbidities like **C**ongestive Heart Failure (+1), **H**ypertension (+1), **A**ge greater than or equal to 75y (+2), **D**iabetes (+1), **S**troke history, TIA, or thromboembolism (+2), **V**ascular disease, e.g., prior MI, PVD, aortic plaque (+1), **A**ge 65-74y (+1), and **S**ex **c**ategory (Female +1). This scoring system is likely more specific for identifying patients at low risk for stroke.
- **$CHADS_2$ Score:** An earlier scoring system for predicting stroke risk in non-valvular atrial fibrillation, which did not include age stratification, sex-based risk, or prior vascular disease.
- **HAS-BLED Score:** A calculation incorporating multiple risk factors to predict the incidence of major bleeding events for patients on oral anticoagulation. A HAS-BLED score is a score based on the presence of hypertension (systolic blood pressure >160 mm Hg), abnormal liver or renal function, history of stroke or bleeding, labile INRs, elderly age (>65 years), use of drugs that promote bleeding, or alcohol excess. A HAS-BLED score greater than or equal to three merits caution before prescribing anticoagulants, with consideration of a mitigation strategy.
- **Paroxysmal Atrial Fibrillation:** An irregularly irregular rhythm that spontaneously initiates and terminates within seven days; this may be symptomatic or asymptomatic.
- **Persistent Atrial Fibrillation:** An irregularly irregular rhythm that lasts longer than seven days and usually requires active treatments to stop the arrhythmia, e.g., antiarrhythmics, cardioversion.
- **Long-standing Persistent Atrial Fibrillation:** Continuous Atrial Fibrillation of greater than 12 months' duration.
- **Permanent Atrial Fibrillation:** An irregularly irregular rhythm where normal rhythm cannot be restored or will not be pursued
- **Warfarin**: A traditional oral anticoagulant taken daily which inactivates an enzyme that allows vitamin K to be used in the body, thus preventing the synthesis of several clotting factors (II, VII, IX, X). Due to many factors that impact metabolism, patients taking this drug need regular measurements of coagulation function, including prothrombin time (PT) and international normalized ratio (INR).
- **Direct Oral Anticoagulants (DOACs)**: This is a newer class of oral anticoagulant drugs including apixaban (Eliquis®), betrixaban

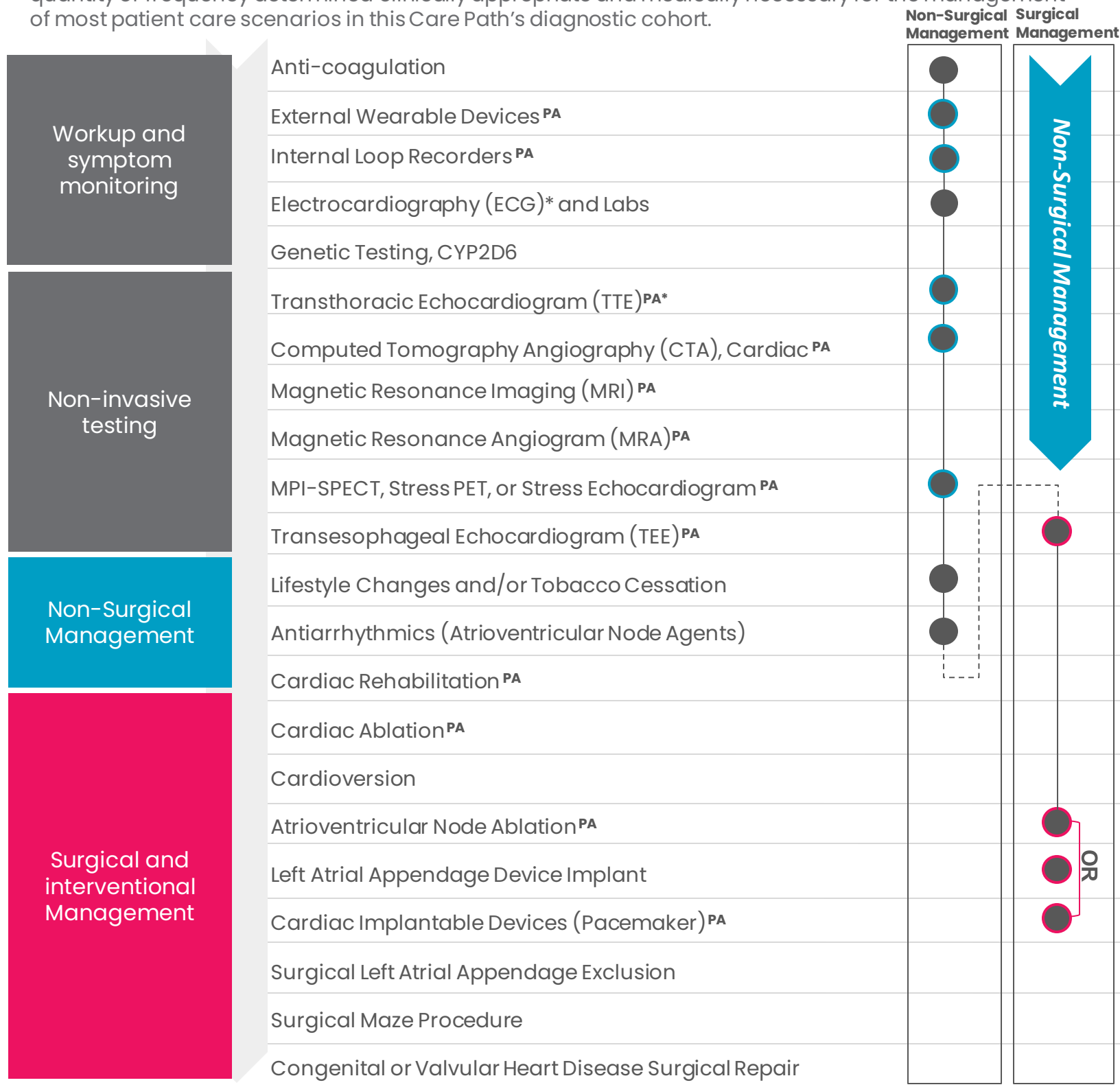
(Bevyxxa®), dabigatran (Pradaxa®), edoxaban (Savaysa®) and rivaroxaban (Xarelto®). Dabigatran is a direct thrombin inhibitor; rivaroxaban, apixaban, and edoxaban are factor Xa inhibitors. Because of their more targeted action, these medications have demonstrated reduced bleeding risks compared to warfarin and do not require blood testing for clinical monitoring.

- **Pre-Test Probability:** The pretest probability of CAD is the likelihood that the patient has CAD, calculated before the test result is known. We will use the 2019 ESC Guidelines for the diagnosis and management of chronic coronary syndromes model to calculate the pretest probability based on age, sex, and type of chest pain.[9,10]

Atrial Fibrillation: Rate Control

What is a "Cohere Care Path"?

These Care Paths organize the services typically considered most clinically optimal and likely to be automatically approved. These service recommendations also include the suggested sequencing and quantity or frequency determined clinically appropriate and medically necessary for the management of most patient care scenarios in this Care Path's diagnostic cohort.



Key

PA = Service may require prior authorization
★ = Denotes preferred service
AND = Services completed concurrently
OR = Services generally mutually exclusive

= Non-surgical management prior authorization group of services
= Surgical management prior authorization group of services
= Subsequent service
= Management path moves to a different management path

Atrial Fibrillation: Rhythm Control

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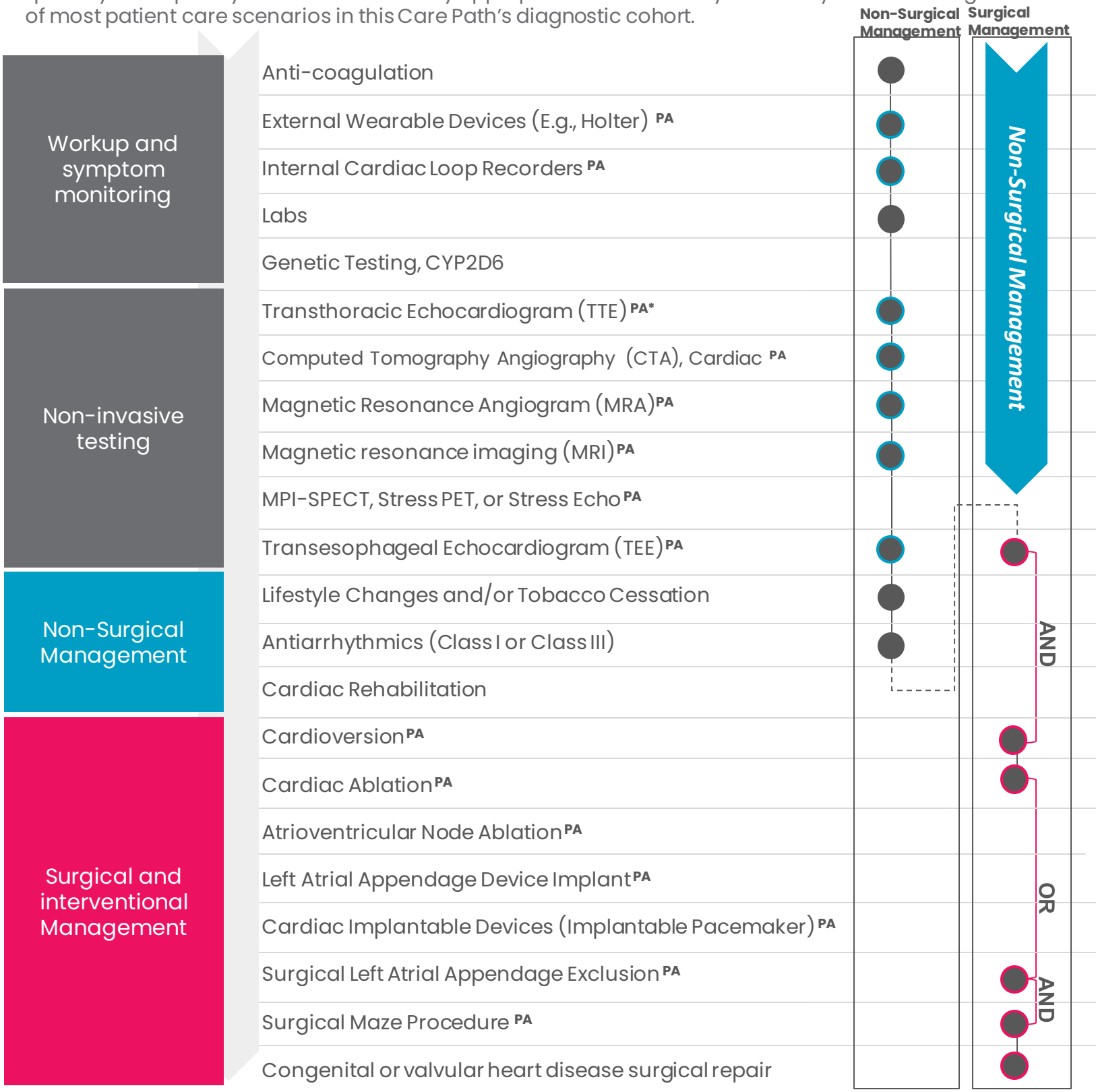

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Care Path Diagnostic Criteria

Disease Classification

Arrhythmias, Atrial Fibrillation

ICD-10 Codes Associated with Classification

ICD-10 Code	Code Description/Definition
I48.0	Paroxysmal atrial fibrillation
I48.1	Persistent atrial fibrillation
I48.11	Longstanding persistent atrial fibrillation
I48.19	Other persistent atrial fibrillation
I48.2	Chronic atrial fibrillation
I48.20	Chronic atrial fibrillation, unspecified
I48.21	Permanent atrial fibrillation
I48.9	Unspecified atrial fibrillation and atrial flutter
I48.91	Unspecified atrial fibrillation
I49	Other cardiac arrhythmias
I49.8	Other specified cardiac arrhythmias
I51.3	Intracardiac thrombosis, not elsewhere classified
T82.110A	Breakdown (mechanical) of cardiac electrode, initial encounter
T82.110D	Breakdown (mechanical) of cardiac electrode, subsequent encounter
T82.111A	Breakdown (mechanical) of cardiac pulse generator (battery), initial encounter
T82.118D	Breakdown (mechanical) of other cardiac electronic device, subsequent encounter
T82.119A	Breakdown (mechanical) of unspecified cardiac electronic device, initial encounter
T82.120A	Displacement of cardiac electrode, initial encounter

T82.121A	Displacement of cardiac pulse generator (battery), initial encounter
T82.128A	Displacement of other cardiac electronic device, initial encounter
T82.190A	Other mechanical complication of cardiac electrode, initial encounter
T82.191A	Other mechanical complication of cardiac pulse generator (battery), initial encounter
T82.198A	Other mechanical complication of other cardiac electronic device, initial encounter
T82.198S	Other mechanical complication of other cardiac electronic device, sequela
T82.199A	Other mechanical complication of unspecified cardiac device, initial encounter
T82.518A	Breakdown (mechanical) of other cardiac and vascular devices and implants, initial encounter
T82.598A	Other mechanical complication of other cardiac and vascular devices and implants, initial encounter
T82.598D	Other mechanical complication of other cardiac and vascular devices and implants, subsequent encounter
T82.7XXA	Infection and inflammatory reaction due to other cardiac and vascular devices, implants and grafts, initial encounter
T82.7XXD	Infection and inflammatory reaction due to other cardiac and vascular devices, implants and grafts, subsequent encounter
T82.837A	Hemorrhage due to cardiac prosthetic devices, implants and grafts, initial encounter
T82.867D	Thrombosis due to cardiac prosthetic devices, implants and grafts, subsequent encounter
T82.897A	Other specified complication of cardiac prosthetic devices, implants and grafts, initial encounter
T82.897S	Other specified complication of cardiac prosthetic devices, implants and grafts, sequela

T85.698A	Other mechanical complication of other specified internal prosthetic devices, implants and grafts, initial encounter
Z45.010	Encounter for checking and testing of cardiac pacemaker pulse generator [battery]
Z45.018	Encounter for adjustment and management of other part of cardiac pacemaker
Z45.02	Encounter for adjustment and management of automatic implantable cardiac defibrillator

Presentation and Etiology

Causes and Risk Factors

- Ischemic heart disease
- Hypertension
- Heart failure
- Valve disease
- Diabetes
- Alcohol abuse
- Thyroid disorders
- Obesity
- Sleep apnea
- Tobacco and other stimulant drugs
- Extreme exertion
- Increasing age
- Family history of atrial fibrillation (AF)[3]
- Studies suggest that weight loss and healthy lifestyle changes can reduce the incidence of atrial fibrillation.[3]

Clinical Presentation

Patients with atrial fibrillation may be asymptomatic. Symptoms include:

- Palpitations
- Fatigue or exercise intolerance
- Dizziness or lightheadedness
- Chest discomfort
- Stroke or stroke-like signs
- Syncope
- Heart failure
- Myocardial infarction
- Hemodynamic collapse[1]

The history should focus on identifying symptoms, risk factors, and comorbidities. The physician should ask about the onset, duration, and severity of any symptoms, as well as aggravating and alleviating factors. The immediate history should include the presence or absence of symptoms, including:

- Fatigue.
- Palpitations.
- Chest pain.
- Syncope.
- Dizziness.
- Dyspnea.[1]

Medical history findings pertinent to atrial fibrillation include:

- Orthopnea.
- Sleep apnea.
- Thyroid disease.
- Recent illnesses.
- Tobacco use.
- Medication history, including supplements, illicit drugs, alcohol, and diet pills.[1]
- Prior cardiac surgery or cardiac interventions.

Typical Physical Exam Findings

The physical examination should focus on the physical findings of atrial fibrillation and comorbid conditions. Patients with atrial fibrillation typically have:

- Irregularly irregular pulse.
- Tachycardia: Heart rates are typically 110-140 BPM and rarely exceed 170 BPM.
- Patients who are hypothermic or who have cardiac drug toxicity may present with bradycardic atrial fibrillation.

Other exam features include:

- Findings associated with thyroid disease:
    - Exophthalmos.
    - Thyromegaly.
- Jugular venous distension or abnormal pulsations.
- Carotid artery bruits; carotid artery bruits suggest peripheral arterial disease and increase the likelihood of coronary artery disease (CAD) and cerebrovascular disease.
- Rales or pleural effusion due to worsening heart failure.

A thorough cardiac examination is crucial for patients with atrial fibrillation. Careful auscultation is necessary to evaluate for murmurs (e.g., aortic or mitral stenosis) and evidence of heart failure (e.g., pulmonary rales, S3 gallop,

and jugular venous distention).[1] A displaced point of maximal impulse or S3 may indicate ventricular enlargement. A prominent P2 suggests pulmonary hypertension.[12]

The presence of ascites or hepatomegaly may indicate right ventricular failure or liver disease.[11] Examination of the lower extremities may reveal cyanosis, clubbing, or edema from chronic pulmonary or cardiac disease.[11] The neurologic exam should evaluate for signs of a transient ischemic attack or cerebrovascular accident. Increased deep tendon reflexes suggest hyperthyroidism.[11]

Typical Diagnostic Findings

Suspected atrial fibrillation can be assessed with the following testing:

- 12-lead electrocardiography
- Holter or other extended monitoring
- Initial blood tests*
- Transthoracic echocardiography (TTE) can evaluate cardiac structure and function.
- Chest x-ray can evaluate for pulmonary disease.[1]
- Transesophageal echocardiography where an atrial fibrillation event is considered high-risk for intracardiac thrombus
- Cardiac MRI with late gadolinium enhancement (LGE) can evaluate the degree of left atrial scarring in the setting of atrial fibrillation, anatomic information in advance of cardiac ablation.[13,14]

Additional testing may be necessary depending on the patient's history and risk factors for coronary artery disease (CAD):

- Stress echocardiography.
- Nuclear perfusion imaging.
- Coronary computed tomography angiography (CCTA).
- Cardiac catheterization.

*Initial blood tests include a complete blood count, an electrolyte panel, thyroid panel, and liver and kidney function tests. Patients with a history of heart failure should have a brain natriuretic peptide (BNP) checked.
If drug use is suspected, the physician should order urine or serum toxicology testing.

If sleep apnea is suspected, then a sleep study should be performed.[1]

Care Path Services & Medical Necessity Criteria

Workup and Symptom Monitoring

Service: Genetic Testing, CYP2D6

General Guidelines

- **Units, Frequency, & Duration:** None.
- **Criteria for Subsequent Requests:** Complete testing for a specific genetic disease only once unless new capabilities for detecting additional mutations develop.
- **Recommended Clinical Approach:** Cytochrome P450 2D6 (CYP2D6) is a predominant enzyme that metabolizes up to 20% of commonly used drugs. The human gene encoding CYP2D6 displays substantial genetic variability. The genetic variation can cause vast differences in clinical responses to drugs between patients.[15] CYP2D6 partially metabolizes cardiovascular drugs such as propafenone, metoprolol, and carvedilol. However, there is not yet a consensus on which CYP2D6 gene variants should be routinely tested for clinical use. The pace of genetic discovery has outstripped the generation of the evidence justifying its clinical adoption.[16]
- **Exclusions:** None.

Medical Necessity Criteria

Indications

➔ **Genetic testing** (CYP2D6 genotyping) is considered appropriate if **ALL** of the following are **TRUE**:
- ◆ The use of the drug propafenone.[17]
- ◆ The patient has not had prior genetic testing for the gene.

Non-Indications

➔ **Genetic testing** is not considered appropriate if **ANY** of the following are **TRUE**:
- ◆ Genetic testing for the CYP2D6 gene was already completed.

Site of Service Criteria

Outpatient.

Procedure Codes (HCPCS/CPT)

HCPCS Code	Code Description/Definition
81226	CYP2D6 (cytochrome P450, family 2, subfamily D, polypeptide 6) (eg, drug metabolism), gene analysis, common variants (eg, *2, *3, *4, *5, *6, *9, *10, *17, *19, *29, *35, *41, *1XN, *2XN, *4XN)

Service: Internal Loop Recorders

General Guidelines

- **Units, Frequency, & Duration:** When medical necessity criteria are met in the absence of exclusionary criteria, referral to a cardiac electrophysiologist (specialized cardiologist) or trained cardiologist to consider the implantation of an internal loop recorder (ILR). A single outpatient procedure is anticipated. The implant duration can be up to four years, depending on the device's battery life. Periodic recordings are actively or passively transmitted for interpretation by a physician.
- **Criteria for Subsequent Requests:** Subsequent requests are only accepted with documentation of device malfunction, an infection that required removal of the initial device, or incorrect placement resulting in poor sensing.
- **Recommended Clinical Approach:** Non-invasive ambulatory ECG monitoring is recommended in patients with risk factors for atrial fibrillation before this intervention. Poor diagnostic yield of non-invasive monitoring in the setting of continued symptoms may lead a physician to recommend an ILR for their patient.[8] In patients with cryptogenic stroke (i.e., stroke of unknown cause) in whom external ambulatory monitoring is inconclusive, implantation of a cardiac monitor (loop recorder) is reasonable to optimize detection of silent AF. However, with an established diagnosis of atrial fibrillation, the need for invasive monitoring is greatly diminished. This procedure is performed by a cardiac electrophysiologist (specialized cardiologist) or trained cardiologist, and referral to a center that supports this service is required.
- **Exclusions:** None.

Medical Necessity Criteria

Indications

➔ **Internal Cardiac Loop Recorder** is considered appropriate if **ALL** of the following are **TRUE**:[18,19,20]

- ◆ No diagnostic conclusions were achieved with non-invasive monitoring methods, such as an external loop recorder or mobile cardiac telemetry.
- ◆ The patient has no other implantable cardiac devices which can detect, record, and transmit data to a physician/cardiologist.

Non-Indications

- ➔ **Internal Cardiac Loop Recorder** is not considered appropriate if **ANY** of the following is **TRUE:**[19]
  - With an existing diagnosis of atrial fibrillation and non-invasive means of monitoring available, implantable loop recorders are not an appropriate diagnostic request in the vast majority of cases.
  - The patient does NOT have any positive clinical risk factors, presentation or history findings, or physical exam findings pertinent to remote ECG monitoring.
  - The patient has a culprit arrhythmic diagnosis identified on non-invasive monitoring.
  - The patient has an active infection or an irreversible bleeding disorder.

Site of Service Criteria

Outpatient or ambulatory surgical center.

Procedure Codes (HCPCS/CPT)

HCPCS Code	Code Description/Definition
33285	Insertion and programming of subcutaneous cardiac rhythm monitor
33286	Removal of subcutaneous cardiac rhythm monitor

Service: External Wearable Devices

General Guidelines

- **Units, Frequency, & Duration:** When medical necessity is met based on described clinical criteria, and exclusionary criteria are absent, non-invasive external cardiac monitoring may be conducted using external wearable devices for 24 hours to 30 days, depending on symptom frequency.
- **Criteria for Subsequent Requests:** Subsequent requests may be considered for incomplete or uninterpretable heart rhythm surveillance during the initial recording.
- **Recommended Clinical Approach:** With evidence of atrial fibrillation based on clinical history, physical exam, and 12-lead ECG, the most appropriate external wearable monitor should be selected based on patient symptom frequency and suspected duration of the episodes. Daily symptoms or brief ongoing episodes of atrial fibrillation may be addressable with a 24-48 hour Holter monitor. Less frequent or asymptomatic events are more likely to be captured with more extended monitoring, either a 30-day loop recorder, cardiac mobile telemetry, or an extended-wear patch device. Consideration of patient ability to trigger a device effectively may also guide device selection in favor of those with more passive event recording capability.[21,22]
- **Exclusions:** Two types of monitors cannot be ordered simultaneously.

Medical Necessity Criteria

Indications

➔ **External Wearable Devices** is considered appropriate if **ANY** of the following is **TRUE**:[6,23]

- ◆ The frequency of atrial fibrillation should reasonably be expected to have a frequency of within every 21 days.
- ◆ Atrial fibrillation that requires frequency and duration quantification in a stable patient who is adequately treated based on their CHA_2DS_2-VASc risk score.
- ◆ The patient has atrial fibrillation and needs evaluation of associated rhythm abnormalities (e.g., sinus node dysfunction, atrial flutter).
- ◆ The patient has suspicion of atrial fibrillation recurrence after ablation.
- ◆ If the patient has had 3 or more external wearable devices in the last six months, consider an internal loop recorder.

Non-Indications

➔ **External Wearable Devices** are not considered appropriate if **ANY** of the following is **TRUE**:

- Palpitations are associated with symptoms suggestive of angina or clinically significant coronary artery obstruction, and monitoring would delay other needed testing or intervention.[24]
- The patient has an implantable cardiac device capable of acquiring clinical data of a similar or equivalent quality to an external cardiac monitor.
- The patient presents in atrial fibrillation with a rapid ventricular response and requires acute treatment for rhythm control and anticoagulation.

Site of Service Criteria

Outpatient.

Procedure Codes (HCPCS/CPT)

HCPCS Code	Code Description/Definition
93228	Other qualified health care professional review and interpretation with report of external mobile cardiovascular telemetry with electrocardiographic recording, concurrent computerized real time data analysis, and greater than 24 hours of accessible electrocardiogram (ECG) data storage (retrievable with query) with ECG triggered and patient selected events transmitted to a remote attended surveillance center for up to 30 days
93229	Technical support for connection and patient instructions for use, attended surveillance for up to 30 days, analysis and other qualified health care professional prescribed transmission of daily and emergent data reports of external mobile cardiovascular telemetry with electrocardiographic recording, concurrent computerized real time data analysis, and greater than 24 hours of accessible electrocardiogram (ECG) data storage (retrievable with query) with ECG triggered and patient selected events transmitted to a remote attended surveillance center

Non-Invasive Testing

Service: Computed Tomography Angiography (CTA)/Computed Tomography with Contrast, Cardiac

General Guidelines

- **Units, Frequency, & Duration:** Single request based on medical necessity criteria
- **Criteria for Subsequent Requests:** New indication or follow-up after an intervention.
- **Recommended Clinical Approach:** Cardiac CTA can create 3D models of the left atrium and pulmonary veins for integration into 3D mapping ablation software or evaluation of left atrial and pulmonary vein anatomy. Cardiac CTA is also an important tool in evaluating atrioesophageal fistulae or pulmonary vein stenosis as a fast and more accessible alternative to invasive angiography. It is also useful for visualization of cardiac veins for resynchronization therapy.[25,26]
- **Exclusions:** Cardiac CT for evaluation of cardiac anatomy may not include other study protocols (e.g., calcium scoring or coronary CT angiography (CCTA)), which may require a different diagnostic indication.

Medical Necessity Criteria

Indications

➔ **Cardiac CTA** is considered appropriate if **ANY** of the following is **TRUE**:
- ◆ The patient is a favorable candidate for ablation of atrial fibrillation, where procedure strategy would benefit from the definition of cardiac anatomy and imaging integration into 3D mapping systems used during ablation.
- ◆ The patient is suspected of having an atrioesophageal fistula following atrial fibrillation ablation.
- ◆ There is clinical suspicion of pulmonary vein stenosis following atrial fibrillation ablation.
- ◆ Visualization of cardiac veins for cardiac resynchronization therapy (CRT).[25,26]

Non-Indications

➔ **Cardiac CTA** may not be considered appropriate if **ANY** of the following is **TRUE**:[27]
- ◆ The patient has non-rate-controlled atrial fibrillation.
- ◆ The patient has contrast dye hypersensitivity.

- The patient is pregnant.
- The patient has impaired renal function because angiographic contrast is utilized for the study.
- The patient uses metformin.
- Another advanced imaging has been requested for the same indication.

Site of Service Criteria

Outpatient.

Procedure Codes (HCPCS/CPT)

HCPCS Code	Code Description/Definition
75572	Computed tomography (CT) of heart with contrast material for evaluation of cardiac structure and morphology, including 3-dimensional (3D) image postprocessing, assessment of cardiac function, and evaluation of venous structures
75573	Computed tomography (CT) of heart with contrast material for evaluation of cardiac structure and morphology in congenital heart disease

Service: Magnetic Resonance Imaging (MRI), Cardiac

General Guidelines

- **Units, Frequency, & Duration:** None.
- **Criteria for Subsequent Requests:** Post-ablation MRI may be requested for medically necessary indications even when a pre-ablation study was performed. Considerations of additional phase, dynamic sequences, positioning of the patient, and use of markers at the discretion of the protocoling radiologist.
- **Recommended Clinical Approach:** MRI usage for atrial fibrillation has expanded over the last decade due to increasing insights into the role of left atrial thickness and scar patterns in predicting ablation success rates. MRI can effectively measure left atrial wall thickness and identify myocardial scar formation with the use of late gadolinium enhancement (LGE) protocols.[13,14] In patients with persistent or even permanent atrial fibrillation, MRI with LGE can help prognosticate the success of ablation therapy and potentially identify more customized approaches to ablation beyond the standard pulmonary vein isolation. In addition to this, MRI can also identify pulmonary vein anatomic abnormalities and mitral valve architecture, which may impact ablation planning. These anatomic features can be integrated into the 3D mapping systems used for real-time catheter navigation and anatomic mapping during atrial fibrillation ablation. Finally, as certain patients are unable to undergo transesophageal echocardiograms (TEE), cardiac MRI can serve as a useful alternative imaging tool to assess for either a left atrial appendage thrombus, an atrioesophageal fistula, or pulmonary vein stenosis (the latter two are complications of extensive RF ablation in the left atrium).[28,29]
- **Exclusions:** Indications for cardiac MRI for atrial fibrillation treatment should be distinct from other cardiac anatomic or myocardial disease indications. In addition, cardiac MRI is specific to cardiac anatomy and peri-cardiac vasculature; other MRI/MRA requests must define the area of the body to be studied. Exclusions include contraindications of MRI (e.g., retained metal, incompatible width to bore size, claustrophobia), incompatibility with following directions (i.e., breath-hold), and renal insufficiency (eGFR less than 30 mL/min per 1.73 m^2) if gadolinium is requested.

Medical Necessity Criteria

Indications

➔ **MRI** is considered appropriate if **ANY** of the following is **TRUE**:[28,32,41]

- A pre-procedural assessment of pulmonary vein anatomy and left atrial geometry is needed in advance of atrial fibrillation ablation for evaluation and integration into 3D mapping software.
- The prognostic information regarding ablation success is needed, specifically for patients who are still candidates for rhythm control but may have lower ablation success rates.
- For evaluation of suspected complications after atrial fibrillation ablation, such as esophageal injury or pulmonary vein stenosis.
- For assessment of cardiac ablation lesion integrity in cases of atrial fibrillation recurrence.

Non-Indications

➔ **MRI** may not be considered appropriate if **ANY** of the following is **TRUE**:[27,28]

- Non-compatible implanted devices.
- Metallic intraocular foreign bodies.
- Claustrophobia.
- There is a potential for adverse reactions to contrast media.
- If the patient has renal insufficiency (eGFR less than 30 mL/min per 1.73 m^2) and if gadolinium contrast is requested, an MRI/MRA may not be considered appropriate.

Site of Service Criteria

Outpatient service.

Procedure Codes (HCPCS/CPT)

HCPCS Code	Code Description/Definition
71550	Magnetic resonance imaging (MRI) of chest without contrast material
71551	Magnetic resonance imaging (MRI) of chest with contrast material
71552	Magnetic resonance imaging (MRI) of chest with contrast material, including noncontrast images and image postprocessing, for evaluation of hilar and mediastinal lymphadenopathy
75557	Cardiac magnetic resonance imaging (MRI) without contrast material, for evaluation of morphology and function
75559	Cardiac magnetic resonance imaging (MRI) with stress imaging, without contrast material, for evaluation of morphology and function

75561	Cardiac magnetic resonance imaging (MRI) without contrast material, followed by contrast material and further sequences, for evaluation of morphology and function
75563	Cardiac magnetic resonance imaging (MRI) with stress imaging, without contrast material, followed by contrast material and further sequences, for evaluation of morphology and function
C9762	Cardiac magnetic resonance imaging for morphology and function, quantification of segmental dysfunction; with strain imaging
C9763	Cardiac magnetic resonance imaging for morphology and function, quantification of segmental dysfunction; with stress imaging
S8042	Mri low field

Service: Magnetic Resonance Angiogram (MRA), Cardiac

General Guidelines

- **Units, Frequency, & Duration:** Single instance must be requested with a cardiac MRI, as indicated by medical necessity criteria (see MRI section).
- **Criteria for Subsequent Requests:** Post-ablation cardiac MRA may be requested with MRI for medically necessary indications even when a pre-ablation study was performed.
- **Recommended Clinical Approach:** Magnetic resonance angiography (MRA) is an adjunct to cardiac MRI procedures, which require a more detailed evaluation of the cardiac chamber and vascular anatomy. MRI with late gadolinium enhancement is the primary technique to quantify left atrial geometry and left atrial scar burden. However, MRA is important for creating 3D models of the left atrium and pulmonary veins for integration into 3D mapping ablation software. MRA is also an essential tool for evaluating pulmonary vein stenosis as a less invasive alternative to catheter-based angiography.[28]
- **Exclusions:** Cardiac MRI/MRA is specific to cardiac anatomy and peri-cardiac vasculature. Other MRI/MRA requests must define the area of the body to be studied.

Medical Necessity Criteria

Indications

➔ **MRA** is considered appropriate if **ANY** of the following is **TRUE**:[28,29]
- ◆ As an adjunct to pre-procedure MRI when 3D reconstruction of pulmonary vein anatomy is needed.
- ◆ As an adjunct to MRI for post-ablation evaluation of esophageal injury or pulmonary vein stenosis.
- ◆ When the prognostic information regarding ablation success is needed, specifically for patients who are still candidates for rhythm control but may have lower ablation success rates
- ◆ Assessment of cardiac ablation lesion integrity in cases of atrial fibrillation recurrence.

Non-Indications

➔ **MRA** may not be considered appropriate if **ANY** of the following is **TRUE**:[27,28]
- ◆ The patient has already received a CTA that adequately defines the targeted cardiac structure (e.g., left atrial anatomy).
- ◆ Non-compatible implanted devices.

- Metallic intraocular foreign bodies.
- Claustrophobia.
- There is a potential for adverse reactions to contrast media.
- If the patient has renal insufficiency (eGFR less than 30 mL/min per 1.73 m^2) and if gadolinium contrast is requested, an MRI/MRA may not be considered appropriate.

Site of Service Criteria

Outpatient.

Procedure Codes (HCPCS/CPT)

HCPCS Code	Code Description/Definition
71555	Magnetic resonance angiography (MRA) of chest with contrast material
C8909	Mra w/cont, chest
C8910	Mra w/o cont, chest
C8911	Mra w/o fol w/cont, chest

Service: Stress Echocardiogram

General Guidelines

- **Units, Frequency, & Duration:** Single instance when medical criteria are met.
- **Criteria for Subsequent Requests:** None.
- **Recommended Clinical Approach:** Stress echocardiography is not a primary diagnostic testing modality for atrial fibrillation. Its value is in investigating comorbidities associated with atrial fibrillation (obstructive coronary artery disease (CAD)). Atrial fibrillation can be associated with stable CAD or acute coronary syndrome. This test is an option for patients with chest pain and intermediate or high pretest probability of CAD.[9,10] It can be accomplished using either exercise or pharmacologic agents (predominantly dobutamine) as the stress mechanism. This test results in no radiation exposure and is typically lower cost than MPI-SPECT. Other advantages of stress echo than MPI-SPECT include shorter patient time commitment and additional information on cardiac structures (valves, ascending aorta, pericardial space). The test is less technically demanding than MPI-SPECT. The diagnosis of atrial fibrillation in the context of other risk factors of CAD may prioritize a diagnostic workup for new or recurrent coronary artery obstruction. However, diagnostic testing for CAD should be initiated within the primary diagnosis and management of the rhythm abnormality.[39]
- **Exclusions:** None.

Medical Necessity Criteria

Indications

➔ **Stress echo** is considered appropriate if **ALL** of the following is **TRUE**:
- ◆ Intermediate or high pretest likelihood of CAD.
- ◆ The patient has chest pain (or an ischemic equivalent), and **ANY** of the following:
  - No known CAD
  - History of CAD with symptoms on optimal guideline-directed medical therapy (GDMT) or documented intolerance to GDMT.
- ◆ The patient has **ANY** of the following:
  - ECG abnormalities that interfere with the ECG diagnosis of ischemia, including **ANY** of the following:[30-32]
    - An inability to achieve the target heart rate with a standard exercise treadmill test (greater than or equal to 85% of age-predicted maximal HR).

        - Ventricular preexcitation (Wolff-Parkinson-White).
        - Ventricular-paced rhythm.
        - Left bundle branch block (LBBB).
        - Greater than 1 mm ST depression at rest.
        - Left ventricular hypertrophy with ST-T abnormalities.
        - The patient takes digoxin.
    - The patient has **ANY** of the following conditions:[32]
        - Severe chronic obstructive pulmonary disease (COPD).
        - Congestive heart failure (CHF).
        - Prior thoracotomy (e.g., CABG).
        - An inability to exercise or exercises submaximally, requiring pharmacological stress.
        - Segmental wall motion abnormalities at rest.

Non-Indications

➔ **Stress echo** is not considered appropriate if **ANY** of the following is **TRUE:**[33-38]

- There was an acute myocardial infarction within the last 48 hours.
- Acute pericarditis/myocarditis.
- Symptomatic, severe aortic stenosis.
- Uncontrolled or unstable arrhythmias.
- Acute aortic dissection.
- Unstable angina or heart failure.
- Acute pulmonary embolism or pulmonary infarction.
- The patient is unable to exercise sufficiently or tolerate pharmacologic agents to simulate exercise.
- Normal coronary angiogram or CCTA within the last two years and with no stenosis or plaque
- Normal stress test (given adequate stress) within the last year.

➔ **Stress echo** may not be considered appropriate if **ANY** of the following is **TRUE:**[34-38]

- Moderate stenotic valvular heart disease.
- There is a high-degree atrioventricular (AV) block.
- Severe hypertension (greater than 180/100 mm Hg).
- There are significant electrolyte abnormalities.
- Tachycardia or bradyarrhythmia.

Site of Service Criteria

Outpatient.

Procedure Codes (HCPCS/CPT)

HCPCS Code	Code Description/Definition
93350	Real time transthoracic echocardiography with 2-dimensional (2D) image documentation during rest and cardiovascular stress test using treadmill and pharmacologically induced stress, with interpretation and report
93351	Real time transthoracic echocardiography with 2-dimensional (2D) image documentation during rest and cardiovascular stress test using treadmill, bicycle exercise and pharmacologically induced stress, with interpretation and report, including performance of continuous electrocardiographic monitoring, with physician supervision
C8928	Tte w or w/o fol w/con,stress
C8930	Tte w or w/o contr, cont ecg

Service: Transesophageal Echocardiogram (TEE)

General Guidelines

- **Units, Frequency, & Duration:** Single procedures performed as needed for defined criteria.
- **Criteria for Subsequent Requests:** Based on subsequent events as described in medical necessity criteria.
- **Recommended Clinical Approach:** Transesophageal echocardiography provides a more comprehensive evaluation of the presence of intracardiac thrombus in the setting of prolonged episodes of atrial fibrillation or episodes of indefinite duration. Compared to transthoracic echo imaging, its superior visualization of the left atrial appendage can assess the safety of both outpatient elective cardioversions and acute inpatient cardioversions. TEE is also valuable for evaluating other heart structures, including better imaging of mitral valve function and the atrial septum, both of which can have clinical significance for a patient with atrial fibrillation.[41]
- **Exclusions:** For patients with short-duration atrial fibrillation (less than 48 hours) and no history of a thromboembolic event, transesophageal echocardiography is usually not indicated (see Non-Indications below).

Medical Necessity Criteria

Indications

➔ **TEE** is considered appropriate if **ANY** of the following are **TRUE**:

- ◆ A patient with paroxysmal or persistent atrial fibrillation with a CHA_2DS_2-VASc score greater than or equal to 2 presenting for planned cardioversion.
- ◆ As a follow-up procedure, if initial imaging yielded an intracardiac thrombus or evidence of left atrial stasis and the patient has had a minimum of 3-4 weeks of therapeutic anticoagulant therapy when a change in therapy is anticipated.[39]
- ◆ In a patient with a CHA_2DS_2-VASc score greater than or equal to 2 (high-risk for thromboembolism) before catheter ablation.[40]
- ◆ As an imaging modality to visualize atrial anatomy during catheter or surgical procedures for left atrial appendage occlusion/obliteration and ANY of the following:[41-44]
  - During catheter or surgical procedure.
  - 45 days after a catheter or surgical procedure.

Non-Indications

➔ **TEE** may not be considered appropriate if **ANY** of the following is **TRUE**:

- The atrial fibrillation duration is reliably defined by a physician and is less than 48 hours in a patient with a CHA_2DS_2-VASc score of 0 in males or 1 in females.[45]
- Another imaging modality (e.g., CT, MRI) is requested simultaneously to evaluate for intracardiac thrombus.
- The patient has a history of esophageal pathology (e.g., stricture, malignancy, fistula, diverticulum), recent surgery of the esophagus, active GI bleeding, esophageal varices (relative), or prior surgery (relative).
- A patient with suspected atrioesophageal fistula following atrial fibrillation ablation.
- The patient has a history of undiagnosed dysphagia.

Site of Service Criteria

Inpatient or outpatient

Procedure Codes (HCPCS/CPT)

HCPCS Code	Code Description/Definition
93312	Real time transesophageal echocardiography with 2-dimensional (2D) image documentation, M-mode recording, probe placement, image acquisition, interpretation, and report
93313	Real time transesophageal echocardiography with 2-dimensional (2D) image documentation and placement of transesophageal probe only
93314	Interpretation and report only of real time transesophageal echocardiography with 2-dimensional (2D) image documentation and image acquisition
93315	Transesophageal echocardiography (TEE) with probe placement, image acquisition, interpretation, and report
93316	Transesophageal echocardiography (TEE) for placement of transesophageal probe only
93317	Interpretation and report only of transesophageal echocardiography (TEE) with image acquisition
93318	Real time transesophageal echocardiography (TEE) with probe placement, 2-dimensional (2D) image acquisition and interpretation
93355	Transesophageal echocardiography (TEE) for guidance of transcatheter closure of left atrial appendage, with quantitative measurements, probe manipulation, interpretation and report
C8925	2d tee w or w/o fol w/con,in

C8926	Tee w or w/o fol w/cont,cong
C8927	Tee w or w/o fol w/cont, mon

Service: Transthoracic Echocardiogram (TTE)

General Guidelines

- **Units, Frequency, & Duration:** Single procedures performed as needed for defined criteria.
- **Criteria for Subsequent Requests:** Subsequent TTEs are appropriate for a patient with any structural or functional heart disease with a documented significant change in clinical status.
- **Recommended Clinical Approach:** Transthoracic echocardiography can be useful for patients with atrial fibrillation when structural heart disease is suspected. In addition, assessments of left ventricular function are more standardized from a transthoracic approach. However, TTE imaging has poor sensitivity for detecting left atrial appendage thrombi and assessing posterior cardiac structures (e.g., mitral valve abnormalities).[46]
- **Exclusions:** None.

Medical Necessity Criteria

Indications

➔ **TTE** is considered appropriate if **ANY** of the following are **TRUE:**[4,7]

- ◆ As the first study in all patients with suspected or confirmed atrial fibrillation.
- ◆ The patient has persistent or permanent atrial fibrillation and a documented history or risk factors for reduced ventricular function (less than 50%), initial or follow-up evaluation.
- ◆ Prior testing that is concerning for heart disease or structural abnormality including, but not limited to chest x-ray, ECG, or cardiac biomarkers.
- ◆ The patient has a suspected new diagnosis of hypertensive heart disease.
- ◆ The patient has permanent or persistent atrial fibrillation and a significant change in clinical status, such as chest pain, shortness of breath, abnormal ECG, palpitations, TIA, stroke, or peripheral embolic event.

Non-Indications

➔ **TTE** is not considered appropriate if **ANY** of the following is **TRUE**:

- ◆ Echocardiography has no contraindications. Echocardiography may have limited benefit in patients at the extremes of adult body weight because a thick chest wall (in markedly obese

patients) or overcrowded ribs (in severely underweight patients) may limit the penetration of ultrasound waves.[47]

Site of Service Criteria

Inpatient or outpatient.

Procedure Codes (HCPCS/CPT)

HCPCS Code	Code Description/Definition
93303	Complete transthoracic echocardiography for congenital cardiac anomalies
93304	Follow-up transthoracic echocardiography for congenital cardiac anomalies
93306	Real time transthoracic echocardiography with 2-dimensional (2D) image documentation, M-mode recording with spectral Doppler echocardiography, and color flow Doppler echocardiography
93307	Complete real time transthoracic echocardiography with 2-dimensional (2D) image documentation
93308	Follow-up real time transthoracic echocardiography with 2-dimensional (2D) image documentation
C8921	Tte w or w/o fol w/cont, com
C8922	Tte w or w/o fol w/cont, f/u
C8923	2d tte w or w/o fol w/con,co
C8924	2d tte w or w/o fol w/con,fu
C8929	Tte w or wo fol wcon,doppler

Non-Surgical Management

Service: Cardiac Rehabilitation

General Guidelines

- **Units, Frequency, & Duration:** Cardiac rehabilitation is generally appropriate for 36 sessions, 60 minutes each, typically over 12 - 18 weeks. Additional sessions can be requested.[48]
- **Criteria for Subsequent Requests:** Current guidelines do not support the need for repeat cardiac rehabilitation in the absence of a new cardiac event.
- **Recommended Clinical Approach:** Cardiac rehabilitation (CR) is an evidence-based intervention that uses patient education, health behavior modification, and exercise training to improve secondary prevention outcomes. It is recognized as an integral component of care for patients with cardiovascular disease.[48,49] Referral to CR is recommended within 12 months after a myocardial infarction (MI), percutaneous coronary intervention, or coronary artery bypass graft surgery. It is also recommended for stable angina or symptomatic peripheral arterial disease (i.e., intermittent claudication).[48] Referral to CR is also recommended after heart valve surgery or cardiac transplantation or in chronic heart failure (NYHA Class I-III) with reduced ejection fraction (HFrEF).[48] The effects of cardiac rehabilitation on mortality, cardiovascular events, hospitalizations, and health-related quality of life are less certain in patients with atrial fibrillation or adult congenital heart disease (ACDH) and after permanent pacemaker/ICD implantation; however, various national and international specialty societies describe its utility in these settings.[50,51,52]
- **Exclusions:** None.

Medical Necessity Criteria

Indications

➔ **Cardiac rehabilitation** is considered appropriate if **ANY** of the following are **TRUE** (within a one year period):[51,52,53]

- Acute myocardial infarction
- Acute coronary artery syndrome
- Chronic stable angina
- Chronic congestive heart failure (NYHA Class I-III, including with LV assist devices)
- After coronary artery bypass surgery
- After a percutaneous coronary intervention

- After valvular surgery
- Cardiac transplantation
- Symptomatic peripheral arterial disease
- Atrial fibrillation
- Adult Congenital Heart Disease
- After permanent pacemaker/ICD implantation

Non-Indications

➔ **Cardiac rehabilitation** may not be considered appropriate if **ANY** of the following are present:[53]

- Active unstable angina
- Decompensated cardiac failure
- Active dangerous or complex arrhythmias
- Dissecting aneurysm
- Myocarditis
- Acute pericarditis
- Severe obstruction of the left ventricular outflow tract
- Severe hypertension
- Exertional hypotension or syncope
- Severe orthopedic limitations
- Recent systemic or pulmonary embolus)
- Severe or symptomatic aortic stenosis
- Previous cardiac rehabilitation in the absence of a new cardiac event.

Site of Service Criteria

Outpatient.

Procedure Codes (HCPCS/CPT)

HCPCS Code	Code Description/Definition
S9472	Cardiac rehabilitation program, nonphysician provider, per diem
93798	Physician or other qualified healthcare professional services for outpatient cardiac rehabilitation; with continuous ECG monitoring (per session)

Surgical or Interventional Management

Service: Cardiac Ablation

General Guidelines

- **Units, Frequency, & Duration:** Single event, no applicable frequency.
- **Criteria for Subsequent Requests:** Unsuccessful initial procedure or recurrence of arrhythmia.
- **Recommended Clinical Approach:** Catheter ablation is a procedural approach to rhythm control for atrial fibrillation. As atrial fibrillation can become refractory to medication over time, ablation is often recommended for symptomatic patients who have become refractory to or intolerant of medical therapy. Ablation, at minimum, entails isolation of tissue around pulmonary vein ostia using radiofrequency or cryothermal energy. Approach an ablation strategy with a realistic risk-benefit analysis of outcomes. Ablation of atrial fibrillation is a higher risk proposition for a patient who is unable to be treated with anticoagulant therapy before, during, and after the ablation.
- **Exclusions:** None.

Medical Necessity Criteria

Indications

➔ **Cardiac ablation** is considered appropriate if **ANY** of the following is **TRUE**:[5,6,54,55]

- ◆ The patient has symptomatic paroxysmal atrial fibrillation and has become refractory or cannot tolerate treatment with a Class I or III antiarrhythmic.
- ◆ The patient has symptomatic paroxysmal atrial fibrillation and has clinical factors which would be contraindications to taking a Class I or III antiarrhythmic.
- ◆ The patient has symptomatic persistent atrial fibrillation and has become refractory or intolerant to a Class I or III antiarrhythmic.
- ◆ For recurrent episodes of symptomatic atrial fibrillation, which occur greater than three months after the initial procedure (ablation).

Non-Indications

➔ **Cardiac ablation** is not considered appropriate if **ANY** of the following is **TRUE:**[5,6,54,55]

- ◆ Recurrence of atrial fibrillation within three months of an ablation.

Site of Service Criteria

Outpatient.

Procedure Codes (HCPCS/CPT)

HCPCS Code	Code Description/Definition
+93655	Intracardiac catheter ablation of a discrete mechanism of arrhythmia which is distinct from the primary ablated mechanism, including repeat diagnostic maneuvers, to treat a spontaneous or induced arrhythmia
93656	Comprehensive electrophysiologic evaluation with transseptal catheterization, with insertion and repositioning of multiple electrode catheters, with attempted induction of arrhythmia, with atrial pacing and recording
+93657	Additional linear or focal intracardiac catheter ablation of the left or right atrium for treatment of atrial fibrillation remaining after completion of pulmonary vein isolation
+93462	Left heart catheterization by transseptal puncture through intact septum or by transapical puncture

Service: Atrioventricular Node Ablation

General Guidelines

- **Units, Frequency, & Duration:** Single event, no applicable frequency.
- **Criteria for Subsequent Requests:** There was an unsuccessful or incomplete AV nodal ablation with residual conduction.
- **Recommended Clinical Approach:** AV nodal ablation in the context of atrial fibrillation is a palliative treatment for persistent or permanent atrial fibrillation, which is symptomatic, has failed rhythm and rate control, and may be causing tachyarrhythmia-induced heart failure. This procedure must be performed in patients with a pre-existing pacemaker or patients for whom a pacemaker implant is planned during the same procedure. AV node ablation is not considered a first-line treatment for rate control of atrial fibrillation.[5,6,56]
- **Exclusions:** AV nodal ablation is a palliative treatment performed by cardiac electrophysiologists and has distinct indications separate from other therapeutic cardiac ablations.

Medical Necessity Criteria

Indications

➔ **AV node ablation** is considered appropriate if **ALL** of the following are **TRUE**:[44,56]

- ◆ Persistent or permanent atrial fibrillation.
- ◆ The patient is an unfavorable candidate for rhythm control, either by pharmaceutical or interventional means.
- ◆ Pharmacologic rate control has been unsuccessful due to rhythm refractoriness or patient intolerance.
- ◆ The patient has a permanent pacemaker implanted or is an appropriate candidate for ventricular pacing.
- ◆ The patient is at-risk of developing or has a history of heart failure.
- ◆ Suspected tachycardia-mediated cardiomyopathy

Non-Indications

➔ **AV node ablation** is not considered appropriate if **ANY** of the following is **TRUE:**[44,56]

- ◆ Paroxysmal atrial fibrillation.
- ◆ The patient is a candidate for pharmacologic or interventional rhythm control.
- ◆ The patient is taking a pharmacologic agent, which is successfully achieving rate control.
- ◆ The patient is not a candidate for permanent pacing.

Site of Service Criteria

Outpatient.

Procedure Codes (HCPCS/CPT)

HCPCS Code	Code Description/Definition
+93613	Intracardiac electrophysiologic three- dimensional mapping
93650	Intracardiac catheter ablation of atrioventricular node function, atrioventricular conduction for creation of complete heart block
+93662	Intracardiac echocardiography during therapeutic/diagnostic intervention, including imaging supervision and interpretation
+93462	Left heart catheterization by transseptal puncture through intact septum or by transapical puncture

Service: Left Atrial Appendage Device Implant

General Guidelines

- **Units, Frequency, & Duration:** Single procedure per clinical criteria.
- **Criteria for Subsequent Requests:** None.
- **Recommended Clinical Approach:** Left atrial appendage devices (WATCHMAN Left Atrial Appendage (LAA) device and AMPLATZER Amulet Occluder) are alternatives to chronic anticoagulant therapy for patients with atrial fibrillation. This procedure is a catheter-based intervention for patients who have become intolerant or have had major bleeding events from recommended anticoagulant regimens.[8] This may also be considered for patients with high-risk occupations that place individuals at-risk for bleeding. The WATCHMAN device has been shown to reduce stroke in the setting of atrial fibrillation at about the same rate as warfarin and is non-inferior to warfarin.[57] In patients with either (1) a CHA_2DS_2-VASc score of 3 of greater, (2) a hospitalization related to a bleeding event, or (3) a cardioembolic event while on oral anticoagulants, left atrial appendage closure devices were non-inferior to direct-acting oral anticoagulants (DOACs) at preventing of stroke, systemic embolism, significant bleeding events, and cardiovascular death.[58] There is a risk of procedural complications with these implants, including peri-device leakage, perforation, pericardial tamponade, thrombosis, stroke, and death.[7,59,60] Current consensus guidelines favor a trial of oral anticoagulation therapy before considering primary LAA closure.
- **Exclusions:** None.

Medical Necessity Criteria

Indications

➔ **Left atrial appendage device implant** is considered appropriate if **ANY** of the following is **TRUE**:[59,60]

- ◆ The patient has atrial fibrillation not associated with valve disease and has had one or more significant bleeding events requiring hospital treatment related to oral anticoagulation therapy (warfarin or direct-acting oral anticoagulants (DOACs)).
- ◆ The patient has had atrial fibrillation and has had thromboembolic events, including TIA or stroke, despite being treated with oral anticoagulation therapy.
- ◆ The patient has atrial fibrillation with medical conditions that present a significant bleeding risk that precludes oral anticoagulant treatment, including inherited bleeding disorders,

severe hepatic or renal dysfunction, and insufficiently treated GI disease with bleeding vascular malformations.

Non-Indications

➔ **Left atrial appendage device implant** is not considered appropriate if **ANY** of the following is **TRUE**:[59,60]

- The patient has a CHA_2DS_2-VASc score of less than 3 or $CHADS_2$ score of less than 2 (CMS NCD criteria).[61]
- The patient has atrial fibrillation and is indicated for long-term oral anticoagulation therapy but has not had any trial of warfarin or DOACs.
- The patient has other medical indications for chronic oral anticoagulant therapy (valve disease, pulmonary embolus, deep vein thrombosis).
- Inability to perform transseptal puncture due to presence of intracardiac mass or atrial septal closure device.

Site of Service Criteria

Outpatient.

Procedure Codes (HCPCS/CPT)

HCPCS Code	Code Description/Definition
33340	Percutaneous transcatheter closure of the left atrial appendage with implant, including fluoroscopy, transseptal puncture, catheter placement(s), left atrial angiography, left atrial appendage angiography, radiological supervision and interpretation

Service: Electrical Cardioversion, Elective

General Guidelines

- **Units, Frequency, & Duration:** Single procedures performed as needed for defined criteria.
- **Criteria for Subsequent Requests:** Recurrence of identical or similar arrhythmia necessitating electrical cardioversion when there is reasonable evidence that sinus rhythm will be sustained.
- **Recommended Clinical Approach:** Electrical cardioversion is a procedure aiming to achieve rhythm control of atrial fibrillation. Cardioversion may be pursued in the acute setting with a hemodynamically unstable arrhythmic event. However, it is more commonly used in an outpatient setting for patients with paroxysmal or persistent atrial fibrillation where sinus rhythm can be reasonably achieved and sustained.[3,6,62] Patients who are candidates for this approach are usually symptomatic with their atrial fibrillation and have received long-term oral anticoagulants treatments. Alternatively, paroxysmal fibrillation episodes can be addressed with electrical cardioversion, with an anticoagulation strategy based on individual CHA_2DS_2-VASc scores for non-valvular atrial fibrillation. In patients with a CHA_2DS_2-VASc score greater than 1, elective cardioversions are often preceded with a transesophageal echocardiogram to rule out the presence of an intracardiac thrombus.[46] The overwhelming proportion of these procedures is done externally, with rare cases using an internal defibrillation catheter.
- **Exclusions:** Emergent, inpatient cardioversions are usually done for hemodynamically unstable atrial fibrillation (or flutter) and would not be subject to prior authorization, and cannot use the listed CPT codes.

Medical Necessity Criteria

Indications

➔ **Electrical cardioversion** is considered appropriate if **ANY** of the following is **TRUE**:[6]

- The patient is hemodynamically stable, with persistent atrial fibrillation, and received at least 3-4 weeks of anticoagulant therapy.
- For patients with atrial fibrillation of unknown or at least a 48 hours duration and without full anticoagulation for the preceding 3-4 weeks, transesophageal echocardiography with cardioversion can be considered provided that anticoagulation can be maintained after cardioversion for at least 4 weeks.

- The patient has paroxysmal or persistent atrial fibrillation with a rapid ventricular response that is not responsive to pharmacologic therapy.
- The patient has paroxysmal atrial fibrillation with an episode duration of less than 48 hours.
- The patient has atrial fibrillation where cardioversion is expected to be necessary before an ablation procedure.

Non-Indications

➔ **Electrical cardioversion** is not considered appropriate if **ANY** of the following is **TRUE**:[6]

- The patient has permanent atrial fibrillation, where sinus rhythm is unlikely to be maintained.
- Rate control is the primary management strategy for the patient's atrial fibrillation.

Site of Service Criteria

Outpatient.

Procedure Codes (HCPCS/CPT)

HCPCS Code	Code Description/Definition
92960	Cardioversion, elective, electrical cardioversion of arrhythmia, external
92961	Cardioversion, elective, electrical cardioversion of arrhythmia, internal

Service: Cardiac Implantable Devices (Pacemaker)

General Guidelines

- **Units, Frequency, & Duration:** One instance, as needed per inclusion criteria.
- **Criteria for Subsequent Requests:** Subsequent requests may be considered for device replacement due to battery end of life (EOL) or elective replacement interval (ERI), replacement after infection, the clinical need for different pacing modes, or replacement after manufacturer recall.
- **Recommended Clinical Approach:** Pacemaker implantation is indicated for a variety of cardiac conduction system abnormalities. Implantation of a cardiac pacemaker in the setting of atrial fibrillation is indicated in a patient who has persistent or permanent atrial fibrillation and meets the criteria for AV node ablation (see the previous section).[6] Depending on the clinical status and comorbidities of the patient, the patient may require either single site or multisite ventricular pacing or added defibrillator function if there are appropriate indications (e.g., heart failure with reduced ejection fraction.) There is no indication for defibrillation function for atrial fibrillation alone. Dual-chamber pacing may assist patients with sick sinus syndrome associated with atrial fibrillation. Adequate atrial pacing may reduce the frequency of atrial fibrillation events; however, pacemaker functions that attempt to treat episodes of atrial fibrillation actively have not shown consistent effectiveness. Therefore, pacing is not recommended as a primary treatment for atrial fibrillation. Many antiarrhythmics used to control atrial fibrillation can exacerbate sick sinus syndrome, which may merit pacing to prevent symptomatic bradycardia. Pacing is almost always required after a surgical Maze procedure when much of the normal electrical impulses from the atria are disrupted.[5]
- **Exclusions:** Atrial fibrillation should only be the primary indication for pacemaker implantation when performed in concert with AV node ablation. Isolated pacemaker insertion should not be requested with atrial fibrillation as the only associated diagnosis.

Medical Necessity Criteria

Indications

➔ **Cardiac implantable devices (pacemakers)** are considered appropriate if **ANY** of the following is **TRUE**:[5,6,63]

- ◆ The patient has symptomatic persistent or permanent atrial fibrillation and is a candidate for AV node ablation.

- The patient has associated symptomatic bradycardia, sinus node dysfunction, or AV node dysfunction with or without antiarrhythmic treatment.

Non-Indications

➔ **Cardiac implantable devices (pacemakers)** are not considered appropriate if **ANY** of the following is **TRUE**:

- The patient has any form of atrial fibrillation and does not meet the criteria for an AV node ablation.
- The patient has atrial fibrillation without other conduction abnormalities, which would merit permanent pacing.

Site of Service Criteria

Inpatient.

Procedure Codes (HCPCS/CPT)

HCPCS Code	Code Description/Definition
33206	Insertion of permanent atrial pacemaker with transvenous electrode
33207	Insertion of permanent ventricular pacemaker with transvenous electrode
33208	Insertion of permanent atrial and ventricular pacemaker with transvenous electrode
33212	Insertion of pacemaker pulse generator with connection to existing single lead
33213	Insertion of pacemaker pulse generator with connection to existing dual leads
33214	Conversion of single chamber implanted pacemaker system to dual chamber system
33216	Insertion of transvenous electrode of permanent pacemaker
33217	Insertion of 2 transvenous electrodes of permanent cardioverter-defibrillator
33221	Insertion of pacemaker pulse generator with existing multiple leads
33224	Transvenous insertion of pacing electrode for left ventricular pacing, with connection to existing pacemaker
33227	Removal and replacement of permanent pacemaker pulse generator in single lead system

33228	Removal and replacement of permanent pacemaker pulse generator in dual lead system
33229	Removal and replacement of permanent pacemaker pulse generator in multiple lead system
33233	Removal of permanent pacemaker pulse generator
33274	Transcatheter insertion of permanent leadless right ventricular pacemaker
33275	Transcatheter removal of permanent leadless pacemaker from right ventricle using imaging guidance
C1779	Lead, pmkr, transvenous vdd
C1785	Pmkr, dual, rate-resp
C1786	Pmkr, single, rate-resp
C1898	Lead, pmkr, other than trans
C1900	Lead, coronary venous
C2619	Pmkr, dual, non rate-resp
C2620	Pmkr, single, non rate-resp
C2621	Pmkr, other than sing/dual

Service: Surgical Left Atrial Appendage Exclusion

General Guidelines

- **Units, Frequency, & Duration:** Single procedure as indicated by clinical criteria.
- **Criteria for Subsequent Requests:** None.
- **Recommended Clinical Approach:** A surgical approach to left atrial appendage (LAA) exclusion is a possible therapy for patients with atrial fibrillation at high-risk for stroke who are undergoing cardiac surgery for other indications. Initially, methods like internal sutures or a non-cutting stapler were used, with poor results due to recanalization of the LAA. However, surgical excision of the LAA, the LARIAT epicardial suture delivery system, or the AtriClip device is more technically effective. While these methods are available, there are only small studies of these techniques to assess stroke risk reduction.[58] There is a risk of procedural complications with the implants, including peri-device leakage, perforation, and pericardial tamponade, thrombosis, stroke, even death. Current consensus guidelines still favor continued oral anticoagulation therapy before and after surgical LAA exclusion. However, surgical LAA excision or exclusion in conjunction with surgical ablation to prevent thromboembolic complications of atrial fibrillation received a Class IIa (Level of evidence: C; "limited data") recommendation in the 2017 Society of Thoracic Surgeons clinical practice guidelines.[64] Surgical occlusion of the LAA may be considered in patients with AF undergoing cardiac surgery as a component of an overall heart team approach to the management of AF.[8] There is currently no data to support prophylactic LAA excision or exclusion in cardiac surgery patients who may be at increased risk for postoperative atrial fibrillation.[65,66] However, the ATLAS trial studying the AtriClip for this purpose is currently ongoing.
- **Exclusions:** None.

Medical Necessity Criteria

Indications

➔ **Surgical left atrial appendage exclusion** is considered appropriate if **ANY** of the following is **TRUE**:[8,58,61,65,66]

- ◆ The patient is scheduled for cardiac surgery and has preoperative atrial fibrillation.
- ◆ The patient has symptomatic atrial fibrillation and is undergoing surgical ablation of atrial fibrillation.

Non-Indications

- ➔ **Surgical left atrial appendage exclusion** is not considered appropriate if **ANY** of the following is **TRUE**:[8,58,61,65,66]
  - ◆ The patient has no other indication for undergoing a cardiac surgical procedure.
  - ◆ The patient has no history of preoperative atrial fibrillation.
  - ◆ Atrial appendage ligation, plication, or AtriClip is included in the mitral valve and maze procedures. It should not be reported separately when performed in the same session as these procedures.

Site of Service Criteria

Inpatient.

Procedure Codes (HCPCS/CPT)

HCPCS Code	Code Description/Definition
33999	Unlisted procedure-cardiac surgery
33267	Exclusion of left atrial appendage, open, any method (eg, excision, isolation via stapling, oversewing, ligation, plication, clip)

Service: Surgical Maze Procedure

General Guidelines

- **Units, Frequency, & Duration:** Single procedure as indicated by clinical criteria.
- **Criteria for Subsequent Requests:** None.
- **Recommended Clinical Approach:** Surgical management of atrial fibrillation is typically approached with a Maze procedure, electrically segmenting the left atrium with radiofrequency ablation. These procedures are highly recommended in atrial fibrillation associated with mitral valve disease (Class I, Level A) that requires surgical intervention. It should also be considered during (1) aortic valve replacement, (2) coronary artery bypass grafting, or (3) aortic valve replacement + coronary artery bypass grafting in patients with symptomatic atrial fibrillation (Class I, Level B). Standalone procedures are considered reasonable for patients who have been refractory to Class I/III antiarrhythmics but are much less common given the advances of percutaneous catheter procedures.[64]
  Maze procedures are also recommended for patients with congenital heart disease with refractory atrial fibrillation who require cardiac surgery to repair or revise their anatomy, especially in high-risk physiology caused by Ebstein's anomaly or univentricular hearts.[67]
  Prophylactic Maze procedure is also reasonable in high-risk patients.[64]
  Surgical LAA excision or exclusion in conjunction with surgical ablation to prevent thromboembolic complications of atrial fibrillation received a Class IIa (Level of evidence: C; "limited data") recommendation in the 2017 Society of Thoracic Surgeons clinical practice guidelines.[67] There is currently no data to support prophylactic LAA excision or exclusion in cardiac surgery patients who may be at increased risk for postoperative atrial fibrillation. However, the ATLAS trial studying the AtriClip for this purpose is currently ongoing (see the previous section).
- **Exclusions:** None.

Medical Necessity Criteria

Indications

➔ **Surgical Maze Procedure** is considered appropriate if **ANY** of the following is **TRUE**:[64-67]

- ◆ In a patient with symptomatic atrial fibrillation related to mitral valve disease requiring surgical intervention.
- ◆ In a patient with symptomatic atrial fibrillation at the time of coronary artery bypass grafting.

- In a patient with symptomatic atrial fibrillation at the time of aortic valve replacement.
- In a patient with atrial fibrillation or at high-risk for developing atrial arrhythmias at the time of congenital heart disease repair or revision.
- In a patient with symptomatic and refractory atrial fibrillation, where percutaneous catheter ablation is unavailable or unlikely to be effective.

Non-Indications

➔ **Surgical Maze Procedure** is not considered appropriate if **ANY** of the following is **TRUE**:

- In a patient with symptomatic atrial fibrillation where no cardiac surgery is planned, percutaneous catheter ablation is a feasible treatment option.

Site of Service Criteria

Inpatient.

Procedure Codes (HCPCS/CPT)

HCPCS Code	Code Description/Definition
33254	Operative tissue ablation and reconstruction of atria, limited (e.g., modified Maze procedure)
33255	Operative tissue ablation and reconstruction of atria, extensive (e.g., Maze procedure); without cardiopulmonary bypass
33256	Operative tissue ablation and reconstruction of atria, extensive (e.g., Maze procedure); with cardiopulmonary bypass
33257	Operative tissue ablation and reconstruction of atria, performed at the time of other cardiac procedure(s), limited (e.g., modified Maze procedure)
33258	Operative tissue ablation and reconstruction of atria, performed at the time of other cardiac procedure(s), extensive (e.g., Maze procedure); without cardiopulmonary bypass
33259	Operative tissue ablation and reconstruction of atria, performed at the time of other cardiac procedure(s),

	extensive (e.g., Maze procedure); with cardiopulmonary bypass
33265	Endoscopy, surgical; operative tissue ablation and reconstruction of atria, limited (e.g., modified Maze procedure); without cardiopulmonary bypass
33266	Endoscopy, surgical; operative tissue ablation and reconstruction of atria, extensive (e.g., Maze procedure); without cardiopulmonary bypass

Surgical Risk Factors

Patient Medical Risk Stratification

Patient Risk Score	Patient Characteristic	Min Range	Max Range	Guidance
1- Very Low Risk	No known medical problems			
2- Low Risk	Hypertension		180/110 mm Hg	
2- Low Risk	Asthma	peak flow >80% of predicted or personal best value		
2- Low Risk	Prior history of alcohol abuse			Screen for liver disease and malnutrition
2- Low Risk	Prior history of tobacco use			
3- Intermediate Risk	Asthma	peak flow <80% of predicted or personal best value		
3- Intermediate Risk	Active alcohol abuse			
3- Intermediate Risk	Age	65	75	
3- Intermediate Risk	History of treated, stable coronary artery disease (CAD)			
3- Intermediate Risk	Stable atrial fibrillation			
3- Intermediate Risk	Diabetes mellitus	HbA1C >7%		
3- Intermediate Risk	Morbid obesity	BMI 30	BMI 40	
3- Intermediate Risk	Anemia	hemoglobin <11 (females), <12 (males)		Workup to identify etiology
3- Intermediate Risk	HIV	CD4 <200 cells/mm3		Get clearance from HIV specialist
3- Intermediate Risk	Rheumatologic disease			Preoperative consultation with rheumatologist re: perioperative medication management
3- Intermediate Risk	Peripheral vascular disease or history of peripheral vascular bypass	ankle-brachial pressure index (ABPI) <0.9		Preoperative consultation with vascular surgeon

3- Intermediate Risk	History of venous thromboembolism (VTE)			
3- Intermediate Risk	Well-controlled obstructive sleep apnea			
3- Intermediate Risk	Malnutrition	transferrin <200 mg/dL albumin <3.5 g/dL prealbumin <22.5 mg/dL total lymphocyte count <1200-1500 cell/mm3 BMI <18		Preoperative consultation with nutritionist
3- Intermediate Risk	Active tobacco Use			Enroll patient in smoking cessation program
3- Intermediate Risk	Known allergy or hypersensitivity to medication needed for procedure			
4- High Risk	Advanced Renal Disease (Creatinine > 2)			
4- High Risk	Diabetes mellitus with complications	HbA1c >8%		
4- High Risk	Age	76	85	
4- High Risk	Oxygen dependent pulmonary disease			
4- High Risk	Sickle cell anemia			
4- High Risk	Obesity	BMI 40		
4- High Risk	Cirrhosis, history of hepatic decompensation or variceal bleeding			
4- High Risk	Impaired cognition; dementia			
4- High Risk	Compensated CHF			
4- High Risk	Cerebrovascular disease			
4- High Risk	Uncontrolled or suspected obstructive sleep apnea (OSA)			
4- High Risk	Renal insufficiency	serum creatinine >1.5 mg/dL or creatinine clearance <100 mL/min		

4- High Risk	Opioid dependence			
5- Very High Risk	Percutaneous Coronary Intervention (PCI) within 1 month			
5- Very High Risk	Cardiovascular: unstable angina, recent myocardial infarction (60 days), uncontrolled atrial fibrillation or other high-grade abnormal rhythm, severe valvular disease, decompensated heart failure			
5- Very High Risk	Primary pulmonary hypertension			Preoperative consultation with pulmonologist warranted
5- Very High Risk	Cirrhosis or severe liver disease, history of hepatic decompensation or variceal bleeding			
5- Very High Risk	Severe frailty, dependence for ADLs, or history of 3 or more falls in last 6 mos			
5- Very High Risk	Obesity		BMI >50	
5- Very High Risk	Age		>85	
5- Very High Risk	History of VTE with CI to anticoagulation, failure of anticoagulation, cessation of anticoagulation therapy secondary to bleeding			Preoperative consultation with hematologist or internist
5- Very High Risk	Renal failure requiring dialysis			
5- Very High Risk	Immunosuppression			
5- Very High Risk	Chronic Pain			

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Review History	
November 15, 2021 (V.1)	**Physician author:** Mary Krebs, MD (Primary Care Physician), Alisa Niksch, MD (Pediatric Cardiologist/Electrophysiologist) **Peer reviewed by:** Carter Newton, MD FACC (Cardiologist), Russell Rotondo, MD FACC (Cardiologist) **Approving Physician:** Russell Rotondo, MD FACC (Cardiologist)
October 20, 2022 (V.2)	**Peer reviewed by:** Ania Garlitski, MD (Cardiologist) **Approving physician:** Russell Rotondo, MD FACC (Cardiologist)