Cohere Medical Policy - Cardiac Catheterization

Clinical Policy for Medical Necessity Review

Version: 1
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Important Notices

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Policy Information:

Specialty Area: Musculoskeletal Care
Policy Name: Cohere Medical Policy - Cardiac Catheterization
Type: [**X**] Adult (18+ yo) | [**X**] Pediatric (0-17 yo)

Table of Contents

Medical Necessity Criteria

Service: Cardiac Catheterization

Description

Cardiac catheterization is an invasive cardiac evaluation method. It allows for direct evaluation of hemodynamics, cardiac pressure, and cardiac output.[1,3] Left heart catheterization involves the insertion of a catheter into an artery in the arm, groin, or wrist. Generally, femoral artery access is more commonly used than radial artery access for left heart catheterization. The catheter is guided to the left ventricle of the heart to measure left ventricular pressures or to obtain an angiogram (left ventriculogram, ventriculography). Left heart catheterization is sometimes performed with coronary angiography, a method of assessing the coronary arteries that supply the muscle of the heart. Depending on the clinical situation, each type of catheterization may be performed concomitantly or separately as stand-alone procedures.[1-4]

Medical Necessity Criteria

Indications

Cardiac catheterization is considered appropriate if **ALL** of the following are **TRUE**:

- **Coronary/bypass angiography with or without left heart catheterization,** and **ANY** of the following[1-4]:
  - This section is not applicable (service not requested); **OR**
  - Acute coronary syndromes (ACS), including elevated troponin or non-ST elevation myocardial infarction (NSTEMI); **OR**
  - Worsening or limiting ischemic symptoms[A] or stable angina despite guideline-directed medical treatment (GDMT)[B] with **ANY** of the following high-risk findings[2,3]:
    - Severe resting left ventricular (LV) dysfunction (left ventricular ejection fraction [LVEF] is less than 40%) that is not readily explained by noncoronary causes; **OR**
    - Reversible perfusion abnormalities that encompass greater than or equal to 10% of the myocardium (SDS = 10) in patients without prior history or evidence of myocardial infarction (MI); **OR**

- Stress electrocardiography (ECG) findings, including **ANY** of the following:
  - Greater than or equal to 2 mm of ST-segment depression at low workload; **OR**
  - Greater than or equal to 2 mm of ST-segment depression that persists into recovery; **OR**
  - Exercise-induced ST-segment elevation of greater than 1.5mm; **OR**
  - Exercise-induced ventricular tachycardia or ventricular fibrillation (VT/VF); **OR**
- Stress-induced LV dysfunction (peak exercise LVEF is less than 40% or drop in LVEF with stress is greater than or equal to 10%); **OR**
- Stress-induced perfusion abnormalities encumbering greater than or equal to 10% of the myocardium; **OR**
- Stress segmental scores indicating multiple vascular territories with abnormalities; **OR**
- Stress-induced LV dilation; **OR**
- Inducible wall motion abnormality (involving more than 2 segments or 2 coronary beds); **OR**
- Wall motion abnormality developing at a low dose of dobutamine (less than or equal to 10 mg/kg/min) or at a low heart rate (less than 120 beats/min); **OR**
- Coronary artery calcium (CAC) score greater than 400 Agatston units; **OR**
- Multivessel obstructive coronary artery disease (CAD) in two or more major coronary arteries (greater than or equal to 70% stenosis) on coronary computed tomography angiography (CCTA); **OR**
- Left main stenosis (greater than or equal to 50% stenosis) on CCTA; **OR**
- FFR-CT less than or equal to 0.80[5-9]; **OR**

- Congenital heart disease with **ANY** of the following[10]:
  - Invasive cardiovascular procedure is planned, requiring pre- or post-operative catheterization or angiographic imaging (e.g., for pressure or gradient measurements); **OR**
  - Noninvasive imaging is inconclusive or discordant with findings on physical exam; **OR**
- Hypertrophic cardiomyopathy (HCM) with **ANY** of the following[11]:
  - Symptomatic HCM after noninvasive imaging; **OR**

        - Evidence of myocardial ischemia; **OR**
        - Prior to septal myectomy; **OR**
    - Symptomatic congestive heart failure (CHF) and **ALL** of the following[1,12]:
        - Ejection fraction is less than 40%; **AND**
        - Echocardiogram is inadequate to determine the cause of dysfunction or the extent of coronary disease; **AND**
        - Contraindications to cardiac computed tomography angiography (CCTA) exist; **AND**
        - No cardiac catheterization, single photon emission computed tomography (SPECT), cardiac positron emission tomography (PET), or stress echocardiogram (ECG) has been performed since the diagnosis of congestive heart failure or cardiomyopathy; **OR**
    - Ventricular fibrillation or sustained ventricular tachycardia; **OR**
    - The patient has survived sudden cardiac arrest or life-threatening ventricular arrhythmia[13]; **OR**
    - Preoperative assessment before **ANY** of the following:
        - Heart valve surgery; **OR**
        - Lung transplant; **OR**
        - Liver transplant; **OR**
    - The patient is being considered for or has received a heart transplant; **AND**
- The procedure is a **left heart catheterization with left ventricular angiogram (ventriculogram)**, and **ANY** of the following is **TRUE**[1,3,4]:
    - This section is not applicable (service not requested); **OR**
    - Assessment of left ventricular systolic function; **OR**
    - Assessment of the degree of mitral regurgitation; **OR**
    - Assessment for a ventricular septal defect, other intracardiac shunts, or other congenital heart abnormalities; **OR**
    - Pericardial tamponade; **OR**
    - Hemodynamic assessment of the aortic valve, only if noninvasive imaging is inadequate[2]; **OR**
    - Measurement of the left ventricular end-diastolic pressure; **OR**
    - Constrictive or restrictive pericarditis; **AND**
- The procedure is a **right cardiac catheterization,** and **ANY** of the following is **TRUE**[1,10,11,14,15]:
    - This section is not applicable (service not requested); **OR**
    - Preoperative assessment before valvular surgery; **OR**
    - Left ventricular dysfunction disproportional to the severity of the

valvular disease; **OR**
    - Pulmonary hypertension disproportional to the severity of the valvular disease; **OR**
    - Clinical uncertainty between (or suspicion of) constrictive versus restrictive physiology; **OR**
    - Suspected pericardial tamponade; **OR**
    - Suspected cardiomyopathy of unknown etiology with symptoms (LVEF less than 40%); **OR**
    - The patient is being considered for or has received a heart transplant; **OR**
    - Patients with stable ischemic heart disease who develop symptoms and signs of heart failure; **OR**
    - Known congenital heart disease when non-invasive tests are inconclusive or discordant with clinical assessment; **OR**
    - Assessing any shunt inside the heart or lungs; **OR**
    - Partial anomalous pulmonary venous connection to define vascular connections; **OR**
    - Cor pulmonale; **OR**
    - For assessment of atrial baffle function (suspected obstruction or leak) after Mustard/Senning operation.

Non-Indications

Cardiac catheterization is not considered appropriate if **ANY** of the following is **TRUE**[1]:

- Coagulopathy; **OR**
- Fever; **OR**
- Systemic infection; **OR**
- Evaluation of syncope[16]; **OR**
- Radiopaque contrast agent allergies in patients who have not been appropriately premedicated.
- Acute or chronic kidney disease; **OR**
- Uncontrolled arrhythmia; **OR**
- Pregnancy; **OR**
- Normal coronary angiogram or CCTA within the last two years and with no stenosis or plaque (for certain left heart catheterization scenarios)[1-4]; **OR**
- Normal stress test (given adequate stress) within the last year (for certain left heart catheterization scenarios).[1-4]

Definitions

- **Ischemic Equivalent:** Chest pain syndrome, anginal equivalent, or ischemic electrocardiogram (ECG) abnormalities are any constellation of clinical findings that the physician believes is consistent with CAD manifestations. Examples of such findings include, but are not limited to, pain, pressure, tightness, or discomfort in the chest, shoulders, arms, neck, back, upper abdomen, or jaw, new ECG abnormalities, or other symptoms/findings suggestive of CAD. Clinical presentations in the absence of chest pain (e.g., dyspnea with exertion, fatigue, or reduced/worsening effort tolerance) consistent with CAD may also be considered an ischemic equivalent.[1-4]

- **Guideline-Directed Medical Treatment (GDMT)** includes the following, as appropriate[3]:
  - Diet, weight loss, and regular physical activity
  - Smoking cessation (if patient is a smoker)
  - Aspirin 75–162 mg daily
  - A statin medication in moderate dosage
  - Antihypertensive medication to achieve a blood pressure level <140/90 mm Hg (if patient is hypertensive)
  - Appropriate glycemic control (if patient is diabetic)

Level of Care Criteria

Inpatient or Outpatient

Procedure Codes (CPT/HCPCS)

CPT/HCPCS Code	Code Description
93451	Right heart catheterization
93452	Left heart catheterization with intraprocedural injection for left ventriculography
93453	Combined right and left heart catheterization with intraprocedural injection for left ventriculography
93454	Catheter placement in coronary artery for coronary angiography, with intraprocedural injection for coronary angiography, imaging supervision, and

	interpretation
93455	Catheter placement in coronary artery for coronary angiography, with intraprocedural injection for coronary angiography, imaging supervision, and interpretation, with catheter placement in bypass graft, with intraprocedural injections for bypass graft angiography
93456	Catheter placement in coronary artery for coronary angiography, with intraprocedural injection for coronary angiography, imaging supervision, and interpretation, with right heart catheterization
93457	Catheter placement in coronary artery for coronary angiography, with intraprocedural injection for coronary angiography, imaging supervision, and interpretation, with catheter placement in bypass graft, with intraprocedural injection for bypass graft angiography and right heart catheterization
93458	Catheter placement in coronary artery for coronary angiography, with intraprocedural injection for coronary angiography, imaging supervision, and interpretation, with left heart catheterization, with intraprocedural injection for left ventriculography
93459	Catheter placement in coronary artery for coronary angiography, with intraprocedural injection for coronary angiography, imaging supervision and interpretation, with left heart catheterization, catheter placement in bypass graft, with bypass graft angiography
93460	Catheter placement in coronary artery for coronary angiography, with intraprocedural injection for coronary angiography, imaging supervision, and interpretation, with right and left heart catheterization
93461	Catheter placement in coronary artery for coronary angiography, with intraprocedural injection for coronary angiography, imaging supervision, and interpretation, with right and left heart

	catheterization, catheter placement in bypass graft, with bypass graft angiography
93462	Left heart catheterization by transseptal puncture through intact septum or by transapical puncture
93593	Right heart catheterization for congenital heart defect(s) including imaging guidance by the proceduralist to advance the catheter to the target zone; normal native connections
93594	Right heart catheterization for congenital heart defect(s) including imaging guidance by the proceduralist to advance the catheter to the target zone; abnormal native connections
93595	Left heart catheterization for congenital heart defect(s) including imaging guidance by the proceduralist to advance the catheter to the target zone, normal or abnormal native connections
93596	Right and left heart catheterization for congenital heart defect(s) including imaging guidance by the proceduralist to advance the catheter to the target zone(s); normal native connections
93597	Right and left heart catheterization for congenital heart defect(s) including imaging guidance by the proceduralist to advance the catheter to the target zone(s); abnormal native connections

Medical Evidence

A study of more than 96,000 patients undergoing left heart catheterization examined the concomitant use of left ventriculography. Approximately 82% (78,705) of patients underwent left ventriculography in addition to left heart catheterization. Use was pronounced among younger patients. Upon cohort analysis of a subgroup comprised of patients who had a very recent ejection fraction assessment (within the last 30 days) and who had no intervening diagnosis (i.e., no new heart failure, no myocardial infarction, no hypotension, no shock), nearly 88% underwent left ventriculography, a total of 32,798 patients that was also higher than the rate observed in the overall cohort. The authors noted that this pattern constituted overuse of left ventriculography, particularly for subgroup patients for whom new information was very unlikely to be obtained. They stated that the reputation of left ventriculography as an "add-on" procedure to cardiac catheterization may confer risks ranging from increased patient morbidity to excess care cost.[17]

A 2016 study compared invasive left ventriculography with two other modalities: 2D echocardiography and quantitative gated single-photon emission computed tomography. All patients underwent each of the three imaging techniques within three months of each other to evaluate chest pain of unclear etiology. The authors concluded that, although invasive left ventriculography is considered the gold standard for the evaluation of symptomology thought to be of cardiac origin, noninvasive imaging may be an adequate substitution due to the strongly positive correlation associated with each of the three imaging modalities for measuring left ventricular ejection fraction. Therefore, invasive left ventriculography may be better utilized among patients who can accept the medical risk of radiation exposure and contrast-induced kidney injury.[18]

A review was published in 2022 on the role of right heart catheterization in patients (RHC) with heart failure. The procedure is a fundamental diagnostic tool for patients experiencing refractory heart failure or cardiogenic shock. The procedure is also crucial for evaluating eligibility for - and managing patients post-implantation of - mechanical circulatory assist devices or heart transplantation. While RHC is not typically suggested for patients with decompensated heart failure, it may benefit those whose condition does not

improve with initial therapy, as well as those with uncertain volume status and persistent hypoperfusion or those being evaluated for advanced cardiac support. It serves an important role in the early, accurate detection of primary graft dysfunction among heart transplant recipients, which is also the leading cause of death among this cohort.[19]

Choi et al. (2023) conducted a retrospective, single-center, observational study to evaluate the discriminatory and prognostic significance of invasively measured left ventricular end-diastolic pressure in patients suspected of having heart failure with preserved ejection fraction (HFpEF). The authors focused on patients with intermediate scores on the Heart Failure Association Pre-test Assessment, Echocardiography and Natriuretic Peptide, Functional Testing, Final Etiology (HFA-PEFF) scale. A total of 404 patients were included; all patients exhibited symptoms of heart failure and had a left ventricular ejection fraction of greater than or equal to 50%. Patients underwent left heart catheterization (LHC). Exclusion criteria included patients who presented without definitive HF symptoms or with acute coronary syndrome (ACS), primary cardiomyopathies, significant valvular heart disease (beyond mild stenosis or moderate left-sided regurgitation), pulmonary arterial hypertension, heart transplantation, constrictive pericarditis, or stress-induced cardiomyopathy. Elevated left ventricular end-diastolic pressure (LVEDP) was linked to a significantly higher 10-year risk of all-cause death or HF readmission in patients suspected of having HFpEF, especially among those with intermediate HFA-PEFF scores. This association remained even after adjusting for multiple variables, including the HFA-PEFF score. (Clinicaltrial.gov, NCT04505449).[20]

Otto et al. (2021) reviewed published guidelines from the American College of Cardiology (ACC) and the American Heart Association (AHA) on the management of patients with valvular heart disease. When noninvasive testing results are inconclusive, especially in symptomatic patients, or when there is a discrepancy between noninvasive tests and clinical findings, cardiac catheterization with direct intracardiac measurements is recommended. Cardiac catheterization provides valuable direct measurements of transvalvular pressure gradients and cardiac output. Contrast angiography may be helpful for semiquantitative assessment, especially when noninvasive results conflict with physical examination findings. Cardiac catheterization offers the advantage of measuring

intracardiac pressures and pulmonary vascular resistance, aiding in decision-making regarding valve intervention.[14]

A 2020 study examined 289 transplanted donor hearts with invasive coronary angiography with the aim of determining the prevalence of post-transplant CAD and cardiac allograft vasculopathy (CAV). Invasive coronary angiography was successfully completed in all transplanted donor hearts. Donor hearts that were diagnosed with moderate CAD did not affect transplant recipient survival and did not accelerate the development of CAV. The authors concluded that there is an application for invasive coronary angiography in the routine evaluation of transplanted donor hearts.[21]

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Clinical Guideline Revision History/Information

Original Date: June 26, 2025		
Review History		
Version 1	06/26/2025	Combined three cardiac catheterization policies (left heart catheterization with coronary angiography/bypass angiography, right heart catheterization with left ventriculogram, combined right-left heart catheterization) into one cardiac catheterization policy, titled "cardiac catheterization". Wordsmithing throughout that did not affect the meaning of the criteria unless otherwise stated below Removed redundant criteria that were already captured by prior indications Provided definition of guideline-directed medical therapy (GDMT) for stable ischemic heart disease References to "suspected" disease were removed (i.e. - indications which stated "known or suspected" were amended to simply say "known")