MULTI-MODALITY APPROPRIATE USE CRITERIA FOR THE DETECTION AND RISK ASSESSMENT OF ISCHEMIC HEART DISEASE

GUIDELINE MAPPING AND REFERENCES

GENERAL REFERENCES

Relevant Prior AUC Documents


Other Relevant AUC/Outcome Studies


### SECTION 1. DETECTION OF CAD/RISK ASSESSMENT

#### Table 1.1 Symptomatic or Ischemic Equivalent

Refer to pages 10 - 11 for relevant definitions, in particular Table A and text for age, gender, symptom presentation, and risk factors relevant to each pre-test probability category.

<table>
<thead>
<tr>
<th>Indication text</th>
<th>Guideline Recommendations</th>
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</table>
| 1. **Low pretest probability of CAD**  
**ECG interpretable AND able to exercise** | 2012 Guideline for the Diagnosis and Management of Patients With Stable Ischemic Heart Disease  
2.1.6. Developing the Probability Estimate  
- “When the probability of disease is ≤ 5%, further testing is usually not warranted because the likelihood of a false-positive test (i.e., positive test in the absence of obstructive CAD) is actually higher than that of a true positive”  
2.2.2. Stress Testing and Advanced Imaging for Initial Diagnosis in Patients With Suspected SIHD Who Require Noninvasive Testing: Recommendations  
2.2.2.1. ABLE TO EXERCISE  
**CLASS IIa**  
- For patients with a low pretest probability of obstructive IHD who do require testing, **standard exercise ECG** testing can be useful, provided the patient has an interpretable ECG and at least moderate physical functioning or no disabling comorbidity. (Level of Evidence: C)  
**CLASS IIb**  
- For patients with a low [includes low intermediate*] pretest probability of obstructive IHD who do require testing, **standard exercise stress echocardiography** might be reasonable, provided the patient has an interpretable ECG and at least moderate physical functioning or no disabling comorbidity. (Level of Evidence: C) - *Note: Guideline includes a vague definition of low pretest probability that includes low intermediate pretest probability (10%-20% or 10%-30%). Guideline definition for intermediate: “The precise definition of intermediate probability (i.e., between ... 20% and 80%, or 30% and 70%) is somewhat arbitrary.”  
**CLASS III: No Benefit**  
- **Pharmacological stress with nuclear MPI, echocardiography, or CMR** is not recommended for patients who have an interpretable ECG and at least moderate physical functioning or no disabling comorbidity (155,167,168). (Level of Evidence: C)  
- **Exercise stress with nuclear MPI** is not recommended as an initial test in low-risk patients who have an interpretable ECG and at least moderate physical functioning or no disabling comorbidity. (Level of Evidence: C)  
2.2.2.3. OTHER  
**CLASS IIb**  
- For patients with a low to intermediate pretest probability of obstructive IHD, **noncontrast cardiac CT** to determine the CAC score may be considered (174). (Level of Evidence: C) |
### Indication text
- Low pretest probability of CAD
- ECG uninterpretable OR unable to exercise

### Guideline Recommendations

| 3.3.1. Coronary Angiography as an Initial Testing Strategy to Assess Risk: Recommendations |
| CLASS III |
| - **Coronary angiography** is not recommended to assess risk in patients who are at low risk according to clinical criteria and who have not undergone noninvasive risk testing. (Level of Evidence: C) |

| 2012 Guideline for the Diagnosis and Management of Patients With Stable Ischemic Heart Disease |
| 2.2.2. Stress Testing and Advanced Imaging for Initial Diagnosis in Patients With Suspected SIHD Who Require Noninvasive Testing: Recommendations |
| 2.2.2.2. UNABLE TO EXERCISE |
| CLASS IIa |
| - **Pharmacological stress echocardiography** is reasonable for patients with a low pretest probability of IHD who require testing and are incapable of at least moderate physical functioning or have disabling comorbidity. (Level of Evidence: C) |
| - **CCTA** is reasonable for patients with a low to intermediate pretest probability of IHD who are incapable of at least moderate physical functioning or have disabling comorbidity (158–166). (Level of Evidence: B) |

| CLASS III: No Benefit |
| - **Standard exercise ECG testing** is not recommended for patients who have an uninterpretable ECG or are incapable of at least moderate physical functioning or have disabling comorbidity (91,132,148–156,161). (Level of Evidence: C) |

| 2.2.2.3. OTHER |
| CLASS IIb |
| - For patients with a low to intermediate pretest probability of obstructive IHD, noncontrast cardiac CT to determine the CAC score may be considered (174). (Level of Evidence: C) |

| 3.3.1. Coronary Angiography as an Initial Testing Strategy to Assess Risk: Recommendations |
| CLASS III |
| - **Coronary angiography** is not recommended to assess risk in patients who are at low risk according to clinical criteria and who have not undergone noninvasive risk testing. (Level of Evidence: C) |
### 2.2.2.3. OTHER

<table>
<thead>
<tr>
<th>INDICATION</th>
<th>GUIDELINE RECOMMENDATIONS</th>
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</table>
| **3.**  
- Intermediate pretest probability of CAD  
- ECG interpretable AND able to exercise |
| **2012 Guideline for the Diagnosis and Management of Patients With Stable Ischemic Heart Disease**  
**2.2.2. Stress Testing and Advanced Imaging for Initial Diagnosis in Patients With Suspected SIHD Who Require Noninvasive Testing: Recommendations**  
**2.2.2.1. ABLE TO EXERCISE**  
CLASS I  
- **Standard exercise ECG testing** is recommended for patients with an intermediate pretest probability of IHD who have an interpretable ECG and at least moderate physical functioning or no disabling comorbidity (114,145–147). *(Level of Evidence: A)*  
- **Exercise stress with nuclear MPI or echocardiography** is recommended for patients with an intermediate to high pretest probability of IHD who have an uninterpretable ECG and at least moderate physical functioning or no disabling comorbidity (91,132,148–156). *(Level of Evidence: B)*  
CLASS IIa  
- **Exercise stress with nuclear MPI or echocardiography** is reasonable for patients with an intermediate to high pretest probability of obstructive IHD who have an interpretable ECG and at least moderate physical functioning or no disabling comorbidity (91,132,148–156). *(Level of Evidence: B)*  
- Pharmacological stress with CMR can be useful for patients with an intermediate to high pretest probability of obstructive IHD who have an uninterpretable ECG and at least moderate physical functioning or no disabling comorbidity (153,157,158). *(Level of Evidence: B)*  
CLASS IIb  
- For patients with a low [includes low intermediate*] pretest probability of obstructive IHD who do require testing, **standard exercise stress echocardiography** might be reasonable, provided the patient has an interpretable ECG and at least moderate physical functioning or no disabling comorbidity. *(Level of Evidence: C)* - *(Note: Guideline includes a vague definition of low pre-test probability that includes low intermediate pre-test probability (10%-20% or 10%-30%). Guideline definition for intermediate: “The precise definition of intermediate probability (i.e., between ... 20% and 80%, or 30% and 70%) is somewhat arbitrary.”)*  
CLASS IIb  
- **CCTA** might be reasonable for patients with an intermediate pretest probability of IHD who have at least moderate physical functioning or no disabling comorbidity (158–166). *(Level of Evidence: B)*  
**2.2.2.3. OTHER**  
CLASS IIb  
- For patients with a low to intermediate pretest probability of obstructive IHD, **noncontrast cardiac CT** to determine the CAC score may be considered (174). *(Level of Evidence: C)* |
Refer to pages 10 - 11 for relevant definitions, in particular Table A and text for age, gender, symptom presentation, and risk factors relevant to each pre-test probability category

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<tr>
<td>Intermediate pretest probability of CAD</td>
<td>2012 Guideline for the Diagnosis and Management of Patients With Stable Ischemic Heart Disease</td>
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<td>ECG uninterpretable OR unable to exercise</td>
<td>2.2.2. Stress Testing and Advanced Imaging for Initial Diagnosis in Patients With Suspected SIHD Who Require Noninvasive Testing: Recommendations</td>
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<tr>
<td></td>
<td>2.2.2. UNABLE TO EXERCISE</td>
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<tr>
<td></td>
<td><strong>CLASS I</strong></td>
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<tr>
<td></td>
<td>• Pharmacological stress with nuclear MPI or echocardiography is recommended for patients with an intermediate to high pretest probability of IHD who are incapable of at least moderate physical functioning or have disabling comorbidity (148–150,152–156). (Level of Evidence: B)</td>
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<tr>
<td></td>
<td><strong>CLASS IIa</strong></td>
</tr>
<tr>
<td></td>
<td>• Pharmacological stress CMR is reasonable for patients with an intermediate to high pretest probability of IHD who are incapable of at least moderate physical functioning or have disabling comorbidity (153,157,158,169–172). (Level of Evidence: B)</td>
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<td><strong>CLASS III: No Benefit</strong></td>
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<td>• Standard exercise ECG testing is not recommended for patients who have an uninterpretable ECG or are incapable of at least moderate physical functioning or have disabling comorbidity (91,132,148–156,161). (Level of Evidence: C)</td>
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<td>2.2.2.3. OTHER</td>
<td><strong>CLASS IIa</strong></td>
</tr>
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<td></td>
<td>• CCTA is reasonable for patients with an intermediate pretest probability of IHD who a) have continued symptoms with prior normal test findings, or b) have inconclusive results from prior exercise or pharmacological stress testing, or c) are unable to undergo stress with nuclear MPI or echocardiography (173). (Level of Evidence: C)</td>
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<td></td>
<td><strong>CLASS IIb</strong></td>
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<td></td>
<td>• For patients with a low to intermediate pretest probability of obstructive IHD, noncontrast cardiac CT to determine the CAC score may be considered (174). (Level of Evidence: C)</td>
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### Indication text

5. High pretest probability of CAD
   ECG Interpretable AND able to exercise

### Guideline Recommendations

#### 2012 Guideline for the Diagnosis and Management of Patients With Stable Ischemic Heart Disease

2.2.2. Stress Testing and Advanced Imaging for Initial Diagnosis in Patients With Suspected SIHD Who Require Noninvasive Testing: Recommendations

2.2.2.1. ABLE TO EXERCISE

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<td>Class I</td>
<td><strong>Exercise stress with nuclear MPI or echocardiography</strong> is recommended for patients with an intermediate to high pretest probability of IHD who have an uninterpretable ECG and at least moderate physical functioning or no disabling comorbidity (91,132,148–156). (Level of Evidence: B)</td>
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<td>Class IIa</td>
<td><strong>Exercise stress with nuclear MPI or echocardiography</strong> is reasonable for patients with an intermediate to high pretest probability of obstructive IHD who have an interpretable ECG and at least moderate physical functioning or no disabling comorbidity (91,132,148–156). (Level of Evidence: B)</td>
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<td>Class IIa</td>
<td><strong>Pharmacological stress with CMR</strong> can be useful for patients with an intermediate to high pretest probability of obstructive IHD who have an uninterpretable ECG and at least moderate physical functioning or no disabling comorbidity (153,157,158). (Level of Evidence: B)</td>
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2.2.2.2. UNABLE TO EXERCISE

| Class I | **Pharmacological stress with nuclear MPI or echocardiography** is recommended for patients with an intermediate to high pretest probability of IHD who are incapable of at least moderate physical functioning or have disabling comorbidity (148–150,152–156). (Level of Evidence: B) |
| Class IIa | **Pharmacological stress CMR** is reasonable for patients with an intermediate to high pretest probability of IHD who are incapable of at least moderate physical functioning or have disabling comorbidity (153,157,158,169–172). (Level of Evidence: B) |
Refer to pages 10-11 for relevant definitions, in particular Table A and text for age, gender, symptom presentation, and risk factors relevant to each pre-test probability category.

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<td>6. High pretest probability of CAD</td>
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<td>2.2.2.1. ABLE TO EXERCISE</td>
<td>CLASS I - Exercise stress with nuclear MPI or echocardiography is recommended for patients with an intermediate to high pretest probability of IHD who have an uninterpretable ECG and at least moderate physical functioning or no disabling comorbidity (91,132,148–156). (Level of Evidence: B)</td>
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<td>CLASS I - Pharmacological stress with nuclear MPI or echocardiography is recommended for patients with an intermediate to high pretest probability of IHD who are incapable of at least moderate physical functioning or having disabling comorbidity (148–150,152–156). (Level of Evidence: B)</td>
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<td>CLASS IIa - Pharmacological stress CMR is reasonable for patients with an intermediate to high pretest probability of IHD who are incapable of at least moderate physical functioning or having disabling comorbidity (153,157,158–169–172). (Level of Evidence: B)</td>
</tr>
</tbody>
</table>

2012 Guideline for the Diagnosis and Management of Patients with Stable Ischemic Heart Disease References:

47. Hachamovitch R. Patient Management After Noninvasive Cardiac Imaging Results From the Study of Myocardial Perfusion and Coronary Anatomy Imaging Roles in Coronary Artery Disease (SPARC). In Press. 2012.
<table>
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</table>
| **7.**  
• Low global CHD risk  
• Regardless of ECG interpretability and ability to exercise | **2010 Guidelines for Assessment of Cardiovascular Risk Among Asymptomatic Adults**  
Class III  
• Persons at low risk (<6% 10-year risk) should not undergo **CAC** measurement for cardiovascular risk assessment. (Level of Evidence: B)  
• **Stress echocardiography** is not indicated for cardiovascular risk assessment in low- or intermediate-risk asymptomatic adults. (Exercise or pharmacologic stress echocardiography is primarily used for its role in advanced cardiac evaluation of symptoms suspected of representing CHD and/or estimation of prognosis in patients with known coronary artery disease or the assessment of patients with known or suspected valvular heart disease.) (Level of Evidence: C)  
• **Stress MPI** is not indicated for cardiovascular risk assessment in low- or intermediate-risk asymptomatic adults (Exercise or pharmacologic stress MPI is primarily used and studied for its role in advanced cardiac evaluation of symptoms suspected of representing CHD and/or estimation of prognosis in patients with known coronary artery disease.) (Level of Evidence: C)  
• **Magnetic resonance imaging** for detection of vascular plaque is not recommended for cardiovascular risk assessment in asymptomatic adults. (Level of Evidence: C)  
• **Coronary computed tomography angiography** is not recommended for cardiovascular risk assessment in asymptomatic adults. (Level of Evidence: C)  
**2012 Guideline for the Diagnosis and Management of Patients With Stable Ischemic Heart Disease**  
3.3.1. Coronary Angiography as an Initial Testing Strategy to Assess Risk: Recommendations  
CLASS III  
• **Coronary angiography** is not recommended to assess risk in patients who are at low risk according to clinical criteria and who have not undergone noninvasive risk testing. (Level of Evidence: C) |
| **8.**  
• Intermediate global CHD risk  
• ECG interpretable and able to exercise | **2010 Guidelines for Assessment of Cardiovascular Risk Among Asymptomatic Adults**  
Class IIA  
• Measurement of **CAC** is reasonable for cardiovascular risk assessment in asymptomatic adults at intermediate risk (10% to 20% 10-year risk). (Level of Evidence: B)  
Class IIB  
• An **exercise ECG** may be considered for cardiovascular risk assessment in intermediate-risk asymptomatic adults (including sedentary adults considering starting a vigorous exercise program), particularly when attention is paid to non-ECG markers such as exercise capacity. (Level of Evidence: B) |
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| 9.                                                                                                       | **2010 Guidelines for Assessment of Cardiovascular Risk Among Asymptomatic Adults**  
Class IIA  
- Measurement of CAC is reasonable for cardiovascular risk assessment in asymptomatic adults at intermediate risk (10% to 20% 10-year risk). (Level of Evidence: B)  
Class IIB  
- An exercise ECG may be considered for cardiovascular risk assessment in intermediate-risk asymptomatic adults (including sedentary adults considering starting a vigorous exercise program), particularly when attention is paid to non-ECG markers such as exercise capacity. (Level of Evidence: B) |
| 10.                                                                                                      | **2010 Guidelines for Assessment of Cardiovascular Risk Among Asymptomatic Adults**  
Class IIB  
- Stress MPI may be considered for advanced cardiovascular risk assessment in asymptomatic adults with diabetes or asymptomatic adults with a strong family history of CHD or when previous risk assessment testing suggests high risk of CHD, such as a coronary artery calcium (CAC) score of 400 or greater. (Level of Evidence: C) |
| 11.                                                                                                      | **2010 Guidelines for Assessment of Cardiovascular Risk Among Asymptomatic Adults**  
Class IIB  
- Stress MPI may be considered for advanced cardiovascular risk assessment in asymptomatic adults with diabetes or asymptomatic adults with a strong family history of CHD or when previous risk assessment testing suggests high risk of CHD, such as a coronary artery calcium (CAC) score of 400 or greater. (Level of Evidence: C) |

**General References**


2010 Guidelines for Cardiovascular Risk Assessment among Asymptomatic Adults: Executive Summary References


### Table 1.3 Other Cardiovascular Conditions

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<tr>
<td><strong>New Onset Heart Failure No Prior CAD Evaluation</strong></td>
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</table>
| **12.** | 2012 Guideline for the Diagnosis and Management of Patients With Stable Ischemic Heart Disease 3.3.1. Coronary Angiography as an Initial Testing Strategy to Assess Risk: Recommendations  
Class I  
- Patients with SIHD who develop symptoms and signs of heart failure should be evaluated to determine whether **coronary angiography** should be performed for risk assessment (352–355). (Level of Evidence: B) |
|  | 2009 Focused Update: Guidelines for the Diagnosis and Management of Heart Failure in Adults  
Section 3: Initial and Serial Clinical Assessment of Patients Presenting with Heart Failure  
Class IIA  
- **Noninvasive imaging** to detect myocardial ischemia and viability is reasonable in patients presenting with HF who have known coronary artery disease and no angina unless the patient is not eligible for revascularization of any kind. (Level of Evidence: B) |
| **13.** | 2012 Guideline for the Diagnosis and Management of Patients With Stable Ischemic Heart Disease 3.3.1. Coronary Angiography as an Initial Testing Strategy to Assess Risk: Recommendations  
Class I  
- Patients with SIHD who develop symptoms and signs of heart failure should be evaluated to determine whether **coronary angiography** should be performed for risk assessment (352–355). (Level of Evidence: B) |
|  | 2009 Focused Update: Guidelines for the Diagnosis and Management of Heart Failure in Adults  
Section 3: Initial and Serial Clinical Assessment of Patients Presenting with Heart Failure  
Class IIB  
- **Noninvasive imaging** may be considered to define the likelihood of coronary artery disease in patients with HF and LV dysfunction. (Level of Evidence: C) |
| **Newly diagnosed systolic heart failure** | |
| **Newly diagnosed diastolic heart failure** | |
### Evaluation of Arrhythmias (incidentally detected by monitoring) without Ischemic Equivalent

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| 14. Sustained VT | **2006 Guideline for the Management of Patients with Ventricular Arrhythmias**<br>**Recommendations for Exercise Testing**<br>Class I<br>• Exercise testing is recommended in adult patients with ventricular arrhythmias who have an intermediate or greater probability of having CHD by age, gender, and symptoms* to provoke ischemic changes or ventricular arrhythmias. (Level of Evidence: B)<br>• Exercise testing, regardless of age, is useful in patients with known or suspected exercise-induced ventricular arrhythmias, including catecholaminergic VT, to provoke the arrhythmia, achieve a diagnosis, and determine the patient’s response to tachycardia. (Level of Evidence: B)<br>• Exercise testing may be useful in patients with ventricular arrhythmias and a low probability of CHD by age, gender, and symptoms.* (Level of Evidence: C)<br><br>**Recommendations for Left Ventricular Function and Imaging**<br>Class I<br>• Exercise testing with an imaging modality (echocardiography or nuclear perfusion [single-photon emission computed tomography (SPECT)]) is recommended to detect silent ischemia in patients with ventricular arrhythmias who have an intermediate probability of having CHD by age, symptoms, and gender and in whom ECG assessment is less reliable because of digoxin use, LVH, greater than 1-mm ST-segment depression at rest, WPW syndrome, or LBBB. (Level of Evidence: B)<br>• Pharmacological stress testing with an imaging modality (echocardiography or myocardial perfusion SPECT) is recommended to detect silent ischemia in patients with ventricular arrhythmias who have an intermediate probability of having CHD by age, symptoms, and gender and are physically unable to perform a symptom limited exercise test. (Level of Evidence: B).<br><br>**2012 Guideline for the Diagnosis and Management of Patients With Stable Ischemic Heart Disease**<br>**3.3.1. Coronary Angiography as an Initial Testing Strategy to Assess Risk: Recommendations**<br>Class I<br>• Patients with SIHD who have survived sudden cardiac death or potentially life-threatening ventricular arrhythmia should undergo coronary angiography to assess cardiac risk (349–351). (Level of Evidence: B)
### 2006 Guideline for the Management of Patients with Ventricular Arrhythmias
#### Recommendations for Left Ventricular Function and Imaging

#### Indication text

<table>
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<tr>
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</table>
| 15. Ventricular Fibrillation | - Exercise testing with an imaging modality (echocardiography or nuclear perfusion [single-photon emission computed tomography (SPECT)]) is recommended to detect silent ischemia in patients with ventricular arrhythmias who have an intermediate probability of having CHD by age, symptoms, and gender and in whom ECG assessment is less reliable because of digoxin use, LVH, greater than 1-mm ST-segment depression at rest, WPW syndrome, or LBBB. (Level of Evidence: B).
- Pharmacological stress testing with an imaging modality (echocardiography or myocardial perfusion SPECT) is recommended to detect silent ischemia in patients with ventricular arrhythmias who have an intermediate probability of having CHD by age, symptoms, and gender and are physically unable to perform a symptom limited exercise test. (Level of Evidence: B). |
| 16. Exercise induced VT or nonsustained VT | - Exercise testing with an imaging modality (echocardiography or nuclear perfusion [single-photon emission computed tomography (SPECT)]) is recommended to detect silent ischemia in patients with ventricular arrhythmias who have an intermediate probability of having CHD by age, symptoms, and gender and in whom ECG assessment is less reliable because of digoxin use, LVH, greater than 1-mm ST-segment depression at rest, WPW syndrome, or LBBB. (Level of Evidence: B).
- Pharmacological stress testing with an imaging modality (echocardiography or myocardial perfusion SPECT) is recommended to detect silent ischemia in patients with ventricular arrhythmias who have an intermediate probability of having CHD by age, symptoms, and gender and are physically unable to perform a symptom limited exercise test. (Level of Evidence: B). |
| 17. Frequent PVCs | - Exercise testing may be useful in the investigation of isolated premature ventricular complexes (PVCs) in middle-aged or older patients without other evidence of CHD. (Level of Evidence: C) |
| 18. Infrequent PVCs | None |
| 19. New-onset atrial fibrillation | None |
| 20. Prior to initiation of anti-arrhythmia therapy in high global CAD risk patients | None |

#### Syncope without Ischemic Equivalent

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<tbody>
<tr>
<td>21. Low global CAD Risk</td>
<td>None</td>
</tr>
<tr>
<td>22. Intermediate or High Global CAD Risk</td>
<td>None</td>
</tr>
</tbody>
</table>

#### General References

2009 Focused Update: Guidelines for the Diagnosis and Management of Heart Failure in Adults

2006 Guidelines for Management of Patients With Ventricular Arrhythmias
### Table 2.1 Sequential Testing (≤ 90 days): Abnormal Prior Test/Study

<table>
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</table>
| **23.** Abnormal rest EKG findings (potentially ischemic in nature such as LBBB, T wave inversions) Low global CAD risk | *2012 Guideline for the Diagnosis and Management of Patients With Stable Ischemic Heart Disease*  
3.2.2.3 Risk Assessment Regardless of Patients' Ability to Exercise  
Class I  
- Pharmacological stress with either nuclear MPI or echocardiography is recommended for risk assessment in patients with SIHD who have LBBB on ECG, regardless of ability to exercise to an adequate workload. (Level of Evidence: B) |
| **24.** Abnormal rest EKG findings (potentially ischemic in nature such as LBBB, T wave inversions) Intermediate to high global CAD risk | *2012 Guideline for the Diagnosis and Management of Patients With Stable Ischemic Heart Disease*  
3.2.2.3 Risk Assessment Regardless of Patients' Ability to Exercise  
Class I  
- Pharmacological stress with either nuclear MPI or echocardiography is recommended for risk assessment in patients with SIHD who have LBBB on ECG, regardless of ability to exercise to an adequate workload. (Level of Evidence: B) |
| **25.** Abnormal prior exercise ECG test                                                                                       | *2012 Guideline for the Diagnosis and Management of Patients With Stable Ischemic Heart Disease*  
3.2.2.3 Risk Assessment Regardless of Patients' Ability to Exercise  
Class I  
- Either exercise or pharmacological stress with imaging (nuclear MPI, echocardiography, or CMR) is recommended for risk assessment in patients with SIHD who are being considered for revascularization of known coronary stenosis of unclear physiological significance (Level of Evidence: B)  
Class IIb  
- CCTA might be considered for risk assessment in patients with SIHD unable to undergo stress imaging or as an alternative to invasive coronary angiography when functional testing indicates a moderate- to high-risk result and knowledge of angiographic coronary anatomy is unknown. (Level of Evidence: C) |

3.3.2 Coronary Angiography to Assess Risk After Initial Workup With Noninvasive Testing: Recommendations  
Class I  
- Coronary arteriography is recommended for patients with SIHD whose clinical characteristics and results of noninvasive testing indicate a high likelihood of severe IHD and when the benefits are deemed to exceed risk. (Level of Evidence: C)
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| 26. Abnormal prior stress imaging study (assumes not repeat same type of stress imaging study) | 2012 Guideline for the Diagnosis and Management of Patients With Stable Ischemic Heart Disease 3.2.2.3 Risk Assessment Regardless of Patients' Ability to Exercise  
Class Ila  
- CCTA can be useful for risk assessment in patients with SIHD who have an indeterminate result from functional testing (286). (Level of Evidence: C)  
Class IIb  
- CCTA might be considered for risk assessment in patients with SIHD unable to undergo stress imaging or as an alternative to invasive coronary angiography when functional testing indicates a moderate- to high-risk result and knowledge of angiographic coronary anatomy is unknown. (Level of Evidence: C)  
3.3.2 Coronary Angiography to Assess Risk After Initial Workup With Noninvasive Testing: Recommendations  
Class I  
- Coronary arteriography is recommended for patients with SIHD whose clinical characteristics and results of noninvasive testing indicate a high likelihood of severe IHD and when the benefits are deemed to exceed risk. (Level of Evidence: C)  
27. Obstructive CAD on prior CCTA study | None  
28. Obstructive CAD on prior invasive coronary angiography | None  
29. Abnormal prior CCT calcium (Agatston Score >100) | 2010 Guidelines for Assessment of Cardiovascular Risk Among Asymptomatic Adults  
Class IIb  
- **Stress MPI** may be considered for advanced cardiovascular risk assessment in asymptomatic adults with diabetes or asymptomatic adults with a strong family history of CHD or when previous risk assessment testing suggests high risk of CHD, such as a coronary artery calcium (CAC) score of 400 or greater. (Level of Evidence: C)  
Table 2.2 Sequential or Follow-up Testing (<1 year): Uncertain Prior Results  
Equivocal, Borderline, or Discordant Prior Noninvasive Evaluation Where Obstructive CAD Remains a Concern  
30. Prior exercise ECG test | 2012 Guideline for the Diagnosis and Management of Patients With Stable Ischemic Heart Disease 3.2.2.3 Risk Assessment Regardless of Patients' Ability to Exercise  
Class Ila  
- CCTA can be useful for risk assessment in patients with SIHD who have an indeterminate result from functional testing. (Level of Evidence: C)  
3.3.2 Coronary Angiography to Assess Risk After Initial Workup With Noninvasive Testing: Recommendations  
- Coronary angiography is reasonable to further assess risk in patients with SIHD and inconclusive prognostic information after noninvasive testing or in patients for whom noninvasive testing is contraindicated or inadequate. (Level of Evidence: C)  
31. Prior stress imaging study (assumes not repeat same type of | 2012 Guideline for the Diagnosis and Management of Patients With Stable Ischemic Heart Disease 3.2.2.3 Risk Assessment Regardless of Patients' Ability to Exercise
### Indication text | Guideline Recommendations
--- | ---
study) | Class IIa  
- CCTA can be useful for risk assessment in patients with SIHD who have an indeterminate result from functional testing. (Level of Evidence: C)

**3.3.2 Coronary Angiography to Assess Risk After Initial Workup With Noninvasive Testing: Recommendations**

- Coronary angiography is reasonable to further assess risk in patients with SIHD and inconclusive prognostic information after noninvasive testing or in patients for whom noninvasive testing is contraindicated or inadequate. (Level of Evidence: C)

32. Prior CTA | None

### Prior Coronary Angiography (Invasive or Noninvasive)

33. Coronary stenosis or abnormality of unclear significance found on cardiac CTA | **2012 Guideline for the Diagnosis and Management of Patients With Stable Ischemic Heart Disease**

3.3.2. Coronary Angiography to Assess Risk After Initial Workup With Noninvasive Testing:Recommendations

Class IIa  
- **Coronary angiography** is reasonable to further assess risk in patients with SIHD and inconclusive prognostic information after noninvasive testing or in patients for whom noninvasive testing is contraindicated or inadequate. (Level of Evidence: C)

3.3.2.3. Risk Assessment Regardless of Patients' Ability to Exercise: Recommendations

Class I  
- Either exercise or pharmacological stress with imaging (radionuclide MPI, echocardiography, or CMR) is recommended for risk assessment in patients with SIHD who are being considered for revascularization of known coronary stenosis of unclear physiologic significance (Level of Evidence: B)

34. Coronary stenosis or anatomic abnormality of unclear significance on previous coronary angiography | **2012 Guideline for the Diagnosis and Management of Patients With Stable Ischemic Heart Disease**

3.3.2.3. Risk Assessment Regardless of Patients' Ability to Exercise: Recommendations

Class I  
- Either exercise or pharmacological stress with imaging (radionuclide MPI, echocardiography, or CMR) is recommended for risk assessment in patients with SIHD who are being considered for revascularization of known coronary stenosis of unclear physiologic significance (Level of Evidence: B)

### Table 2.3 Follow-up testing (>1 month) Asymptomatic or Stable Symptoms

<table>
<thead>
<tr>
<th>Indication text</th>
<th>Guideline Recommendations</th>
</tr>
</thead>
</table>
| Abnormal Prior Exercise ECG Study  
Asymptomatic (Without Ischemic Equivalent) or Stable Symptoms |
<table>
<thead>
<tr>
<th>Indication text</th>
<th>Guideline Recommendations</th>
</tr>
</thead>
</table>
| 35. Last test < 2 years ago | **2012 Guideline for the Diagnosis and Management of Patients With Stable Ischemic Heart Disease**  
**6.3.2. Noninvasive Testing in Known SIHD: Asymptomatic (or Stable Symptoms): Recommendations**  
Class IIB  
- **Standard exercise ECG testing** performed at 1 year or longer intervals might be considered for follow-up assessment in patients with SIHD who have had prior evidence of silent ischemia or at high-risk for a recurrent cardiac event and are able to exercise to an adequate workload and have an interpretable ECG. (Level of Evidence: C)  
- In patients who have no new or worsening symptoms, or no prior evidence of silent ischemia and are not at high risk for a recurrent cardiac event, the usefulness of annual surveillance exercising ECG testing is not well established. (Level of Evidence: C) |
| 36. Last test ≥ 2 years ago | **2012 Guideline for the Diagnosis and Management of Patients With Stable Ischemic Heart Disease**  
**6.3.2. Noninvasive Testing in Known SIHD: Asymptomatic (or Stable Symptoms): Recommendations**  
Class IIa  
- Radionuclide MPI, echocardiography, or CMR with either exercise or pharmacological stress can be useful for follow-up assessment at 2-year or longer intervals in patients with SIHD with prior evidence of silent ischemia or at high risk for a recurrent cardiac event, and who are a) unable to exercise to an adequate workload, b) have an uninterpretable ECG, or c) have a history of incomplete coronary revascularization. (Level of Evidence: C) |

**Abnormal Prior Stress Imaging Study**  
Asymptomatic (Without Ischemic Equivalent) or Stable Symptoms

<table>
<thead>
<tr>
<th>Indication text</th>
<th>Guideline Recommendations</th>
</tr>
</thead>
<tbody>
<tr>
<td>37. Last test &lt; 2 years ago</td>
<td>None</td>
</tr>
<tr>
<td>38. Last test ≥ 2 years ago</td>
<td>None</td>
</tr>
</tbody>
</table>

**Obstructive CAD on Prior Coronary Angiography (Invasive or Noninvasive)**  
Asymptomatic (Without Ischemic Equivalent) or Stable Symptoms

<table>
<thead>
<tr>
<th>Indication text</th>
<th>Guideline Recommendations</th>
</tr>
</thead>
<tbody>
<tr>
<td>39. Last test &lt; 2 years ago</td>
<td>None</td>
</tr>
<tr>
<td>40. Last test ≥ 2 years ago</td>
<td>None</td>
</tr>
</tbody>
</table>

**Prior Coronary Calcium Agatston Score**  
Asymptomatic (Without Ischemic Equivalent) or Stable Symptoms

<table>
<thead>
<tr>
<th>Indication text</th>
<th>Guideline Recommendations</th>
</tr>
</thead>
<tbody>
<tr>
<td>41. Agatston score &lt; 100</td>
<td>None</td>
</tr>
</tbody>
</table>
| 42. Low to intermediate global CAD risk  
Agatston score between 100 and 400 | None |
| 43. High global CAD risk  
Agatston score between 100 and 400 | None |
| 44. Agatston score > 400 | None |

**Normal Prior Exercise ECG test**  
Asymptomatic (Without Ischemic Equivalent)

<table>
<thead>
<tr>
<th>Indication text</th>
<th>Guideline Recommendations</th>
</tr>
</thead>
<tbody>
<tr>
<td>45. Low global CAD Risk</td>
<td>None</td>
</tr>
</tbody>
</table>
| 46. Intermediate to high global CAD Risk  
Test < 2 years ago | None |
### Table 2.4 Follow-up Testing (> 1 month) New or Worsening Symptoms

<table>
<thead>
<tr>
<th>Indication text</th>
<th>Guideline Recommendations</th>
</tr>
</thead>
<tbody>
<tr>
<td>47. <strong>Intermediate to high global CAD Risk</strong></td>
<td>None</td>
</tr>
<tr>
<td>48. <strong>Low global CAD Risk</strong></td>
<td>None</td>
</tr>
<tr>
<td>49. <strong>Intermediate to high global CAD Risk</strong></td>
<td>None</td>
</tr>
<tr>
<td>50. <strong>Intermediate to high global CAD Risk</strong></td>
<td>None</td>
</tr>
<tr>
<td>51. <strong>Low global CAD Risk</strong></td>
<td>None</td>
</tr>
<tr>
<td>52. <strong>Intermediate to high global CAD Risk</strong></td>
<td>None</td>
</tr>
<tr>
<td>53. <strong>Intermediate to high global CAD Risk</strong></td>
<td>None</td>
</tr>
<tr>
<td>54. <strong>Low global CAD Risk</strong></td>
<td>None</td>
</tr>
<tr>
<td>55. <strong>Intermediate to high global CAD Risk</strong></td>
<td>None</td>
</tr>
<tr>
<td>56. <strong>Intermediate to high global CAD Risk</strong></td>
<td>None</td>
</tr>
</tbody>
</table>

**Normal Prior Stress Imaging Study**

OR Non-obstructive CAD on Angiogram (Invasive or Noninvasive)

Asymptomatic (Without Ischemic Equivalent)

<table>
<thead>
<tr>
<th>Indication text</th>
<th>Guideline Recommendations</th>
</tr>
</thead>
<tbody>
<tr>
<td>47. <strong>Intermediate to high global CAD Risk</strong></td>
<td>None</td>
</tr>
<tr>
<td>48. <strong>Low global CAD Risk</strong></td>
<td>None</td>
</tr>
<tr>
<td>49. <strong>Intermediate to high global CAD Risk</strong></td>
<td>None</td>
</tr>
<tr>
<td>50. <strong>Intermediate to high global CAD Risk</strong></td>
<td>None</td>
</tr>
<tr>
<td>51. <strong>Low global CAD Risk</strong></td>
<td>None</td>
</tr>
<tr>
<td>52. <strong>Intermediate to high global CAD Risk</strong></td>
<td>None</td>
</tr>
<tr>
<td>53. <strong>Intermediate to high global CAD Risk</strong></td>
<td>None</td>
</tr>
<tr>
<td>54. <strong>Low global CAD Risk</strong></td>
<td>None</td>
</tr>
<tr>
<td>55. <strong>Intermediate to high global CAD Risk</strong></td>
<td>None</td>
</tr>
<tr>
<td>56. <strong>Intermediate to high global CAD Risk</strong></td>
<td>None</td>
</tr>
</tbody>
</table>

**Normal Prior Non-imaging Exercise ECG Test**

Stable Symptoms

<table>
<thead>
<tr>
<th>Indication text</th>
<th>Guideline Recommendations</th>
</tr>
</thead>
<tbody>
<tr>
<td>47. <strong>Intermediate to high global CAD Risk</strong></td>
<td>None</td>
</tr>
<tr>
<td>48. <strong>Low global CAD Risk</strong></td>
<td>None</td>
</tr>
<tr>
<td>49. <strong>Intermediate to high global CAD Risk</strong></td>
<td>None</td>
</tr>
<tr>
<td>50. <strong>Intermediate to high global CAD Risk</strong></td>
<td>None</td>
</tr>
<tr>
<td>51. <strong>Low global CAD Risk</strong></td>
<td>None</td>
</tr>
<tr>
<td>52. <strong>Intermediate to high global CAD Risk</strong></td>
<td>None</td>
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<td>53. <strong>Intermediate to high global CAD Risk</strong></td>
<td>None</td>
</tr>
<tr>
<td>54. <strong>Low global CAD Risk</strong></td>
<td>None</td>
</tr>
<tr>
<td>55. <strong>Intermediate to high global CAD Risk</strong></td>
<td>None</td>
</tr>
<tr>
<td>56. <strong>Intermediate to high global CAD Risk</strong></td>
<td>None</td>
</tr>
</tbody>
</table>

**Normal Prior Stress Imaging Study**

OR Non-Obstructive CAD on Angiogram (Invasive or Noninvasive)

Stable Symptoms

<table>
<thead>
<tr>
<th>Indication text</th>
<th>Guideline Recommendations</th>
</tr>
</thead>
<tbody>
<tr>
<td>47. <strong>Intermediate to high global CAD Risk</strong></td>
<td>None</td>
</tr>
<tr>
<td>48. <strong>Low global CAD Risk</strong></td>
<td>None</td>
</tr>
<tr>
<td>49. <strong>Intermediate to high global CAD Risk</strong></td>
<td>None</td>
</tr>
<tr>
<td>50. <strong>Intermediate to high global CAD Risk</strong></td>
<td>None</td>
</tr>
<tr>
<td>51. <strong>Low global CAD Risk</strong></td>
<td>None</td>
</tr>
<tr>
<td>52. <strong>Intermediate to high global CAD Risk</strong></td>
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</tr>
<tr>
<td>53. <strong>Intermediate to high global CAD Risk</strong></td>
<td>None</td>
</tr>
<tr>
<td>54. <strong>Low global CAD Risk</strong></td>
<td>None</td>
</tr>
<tr>
<td>55. <strong>Intermediate to high global CAD Risk</strong></td>
<td>None</td>
</tr>
<tr>
<td>56. <strong>Intermediate to high global CAD Risk</strong></td>
<td>None</td>
</tr>
</tbody>
</table>

### Table 2.4 Follow-up Testing (> 1 month) New or Worsening Symptoms

<table>
<thead>
<tr>
<th>Indication text</th>
<th>Guideline Recommendations</th>
</tr>
</thead>
<tbody>
<tr>
<td>57. <strong>Normal exercise ECG test</strong></td>
<td>2012 Guideline for the Diagnosis and Management of Patients With Stable Ischemic Heart Disease</td>
</tr>
<tr>
<td>58. <strong>Non-obstructive CAD on coronary angiography (invasive or non-invasive) OR normal prior stress imaging study</strong></td>
<td>6.3.1.1. Patients Able to Exercise</td>
</tr>
<tr>
<td>59. <strong>Abnormal exercise ECG test</strong></td>
<td>Class I</td>
</tr>
<tr>
<td>60. <strong>Abnormal prior stress imaging study hy</strong></td>
<td>• <strong>Standard exercise ECG testing</strong> is recommended in patients with known SIHD who have new or</td>
</tr>
<tr>
<td>61. <strong>Obstructive CAD on CCTA study</strong></td>
<td>worsening symptoms not consistent with UA, and who have a) at least moderate physical functioning and</td>
</tr>
<tr>
<td>62. <strong>Obstructive CAD on invasive coronary angiography</strong></td>
<td>b) an interpretable ECG (Level of Evidence: B)</td>
</tr>
<tr>
<td></td>
<td>• <strong>Exercise with radionuclide MPI or echocardiography</strong> is recommended in patients with known SIHD</td>
</tr>
<tr>
<td></td>
<td>who have new or worsening symptoms not consistent with UA, and who have a) at least moderate</td>
</tr>
<tr>
<td>Indication text</td>
<td>Guideline Recommendations</td>
</tr>
<tr>
<td>-----------------</td>
<td>---------------------------</td>
</tr>
<tr>
<td>Class IIA</td>
<td><strong>Exercise with nuclear MPI or echocardiography</strong> is reasonable in patients with known SIHD who have new or worsening symptoms not consistent with UA and who have a) at least moderate physical function and no disabling comorbidity, b) previously required imaging with exercise stress, or c) known multivessel disease or high risk for multivessel disease.</td>
</tr>
<tr>
<td>Class III</td>
<td><strong>Pharmacological stress imaging with nuclear MPI, echocardiography, or CMR</strong> is not recommended in patients with known SIHD who have new or worsening symptoms not consistent with UA and who are capable of at least moderate physical functioning or have no disabling comorbidity (Level of Evidence C).</td>
</tr>
<tr>
<td>6.3.1.2 Patients Unable to Exercise</td>
<td></td>
</tr>
<tr>
<td>Class I</td>
<td><strong>Pharmacological stress imaging with nuclear MPI or echocardiography</strong> is recommended in patients with known SIHD who have new or worsening symptoms not consistent with UA and who are incapable of at least moderate physical functioning or have disabling comorbidity (Level of Evidence B).</td>
</tr>
<tr>
<td>Class IIA</td>
<td><strong>Pharmacological stress imaging with CMR</strong> is reasonable in patients with known SIHD who have new or worsening symptoms not consistent with UA and who are incapable of at least moderate physical functioning or have disabling comorbidity (Level of Evidence B).</td>
</tr>
<tr>
<td>Class III: No Benefit</td>
<td><strong>Standard exercise ECG testing</strong> should not be performed in patients with known SIHD who have new or worsening symptoms not consistent with UA and who a) are incapable of at least moderate physical functioning or have disabling comorbidity or b) have an uninterpretable ECG (Level of Evidence C).</td>
</tr>
<tr>
<td>6.3.1.3 Irrespective of Ability to Exercise</td>
<td></td>
</tr>
<tr>
<td>Class IIB</td>
<td><strong>CCTA</strong> might be reasonable in patients with known SIHD who have new or worsening symptoms not consistent with UA, irrespective of ability to exercise, in the absence of known moderate or severe calcification or if the CCTA is intended to assess coronary stents less than 3 mm in diameter (Level of Evidence B).</td>
</tr>
<tr>
<td>3.2.2.2. Risk Assessment in Patients Not Able to Exercise</td>
<td></td>
</tr>
</tbody>
</table>
| Class IIA        | **Exercise with radionuclide MPI or echocardiography** is reasonable in patients with known SIHD who have new or worsening symptoms not consistent with UA, and who have either a) at least moderate physical functioning and no disabling comorbidity, b) previously required imaging with exercise stress or c)
known or at high risk for multivessel disease. (Level of Evidence: B)

Class IIB

- CCTA might be reasonable in patients with known SIHD who have new or worsening symptoms not consistent with UA, irrespective of ability to exercise in the absence of known moderate or severe calcification or if the CCTA is intended to assess coronary stents less than 3 mm in diameter. (Level of Evidence: A)

63. Abnormal CCT calcium (Agatston Score >100)

General References


2012 Guideline for the Diagnosis and Management of Patients With Stable Ischemic Heart Disease References:
### Table 2.4 Symptomatic (Ischemic Equivalent)

<table>
<thead>
<tr>
<th>Indication text</th>
<th>Guideline Recommendations</th>
</tr>
</thead>
</table>
| 64. Evaluation of ischemic equivalent                | 2012 Guideline for the Diagnosis and Management of Patients With Stable Ischemic Heart Disease 6.3.2. Noninvasive Testing in Known SIHD—Asymptomatic (or Stable Symptoms): Recommendations  
Class III  
- Nuclear MPI, echocardiography, or CMR, with either exercise or pharmacological stress or CCTA, is not recommended for follow-up assessment in patients with SIHD, if performed more frequently than at a) 5-year intervals after CABG or b) 2-year intervals after PCI. (Level of Evidence: C) |

### Table 2.5 Asymptomatic (without Ischemic Equivalent)

<table>
<thead>
<tr>
<th>Indication text</th>
<th>Guideline Recommendations</th>
</tr>
</thead>
<tbody>
<tr>
<td>65. Incomplete revascularization</td>
<td>None</td>
</tr>
<tr>
<td>66. Additional revascularization feasible</td>
<td>None</td>
</tr>
<tr>
<td>67. Prior left main coronary stent</td>
<td>None</td>
</tr>
</tbody>
</table>
| 68. < 5 years after CABG                              | 2012 Guideline for the Diagnosis and Management of Patients With Stable Ischemic Heart Disease 6.3.2. Noninvasive Testing in Known SIHD—Asymptomatic (or Stable Symptoms): Recommendations  
Class III  
- Nuclear MPI, echocardiography, or CMR, with either exercise or pharmacological stress or CCTA, is not recommended for follow-up assessment in patients with SIHD, if performed more frequently than at a) 5-year intervals after CABG or b) 2-year intervals after PCI. (Level of Evidence: C) |
| 69. ≥ 5 years after CABG                              | None                                                                                      |
| 70. < 2 years after PCI                               | 2012 Guideline for the Diagnosis and Management of Patients With Stable Ischemic Heart Disease 6.3.2. Noninvasive Testing in Known SIHD—Asymptomatic (or Stable Symptoms): Recommendations  
Class III  
- Nuclear MPI, echocardiography, or CMR, with either exercise or pharmacological stress or CCTA, is not recommended for follow-up assessment in patients with SIHD, if performed more frequently than at a) 5-year intervals after CABG or b) 2-year intervals after PCI. (Level of Evidence: C) |
| 71. ≥ 2 years after PCI                               | 2012 Guideline for the Diagnosis and Management of Patients With Stable Ischemic Heart Disease 6.3.2. Noninvasive Testing in Known SIHD—Asymptomatic (or Stable Symptoms): Recommendations  
Class III  
- Routine periodic stress testing of asymptomatic patients after PCI without specific clinical indications should not be performed. (Level of Evidence: C) |
Indication text | Guideline Recommendations
---|---
Class IIa | Nuclear MPI, echocardiography, or CMR with either exercise or pharmacological stress can be useful for follow-up assessment at 2 year or longer intervals in patients with SIHD with prior evidence of silent ischemia or who are at high risk for recurrent cardiac event and a) are unable to exercise to an adequate workload, b) have an uninterpretable ECG, or c) have a history of incomplete coronary revascularization. (Level of Evidence: C)

Class III: NO BENEFIT | Routine periodic stress testing of asymptomatic patients after PCI without specific clinical indications should not be performed. (Level of Evidence: C)

General References

2012 Guideline for the Diagnosis and Management of Patients with Stable Ischemic Heart Disease References:

2011 PCI Guidelines


### SECTION 3: PREOPERATIVE EVALUATION FOR NONCARDIAC SURGERY

#### Table 3.1 Moderate to good functional capacity (≥ 4 METs) OR no clinical risk factors

<table>
<thead>
<tr>
<th>Indication text</th>
<th>Guideline Recommendations</th>
</tr>
</thead>
</table>
Class III  
Noninvasive testing is not useful for patients with no clinical risk factors undergoing intermediate-risk noncardiac surgery. (Level of Evidence: C) |

#### Table 3.2 Asymptomatic AND < 1 year post any of the following Normal CT or invasive angiogram, normal stress test for CAD, or revascularization

<table>
<thead>
<tr>
<th>Indication text</th>
<th>Guideline Recommendations</th>
</tr>
</thead>
<tbody>
<tr>
<td>72. Any surgery</td>
<td>None</td>
</tr>
</tbody>
</table>

#### Table 3.3 Poor or unknown functional capacity (< 4 METs)

<table>
<thead>
<tr>
<th>Indication text</th>
<th>Guideline Recommendations</th>
</tr>
</thead>
</table>
| 73. Low-risk surgery  
≥ 1 clinical risk factor | 2007 Guidelines on Perioperative Cardiovascular Evaluation and Care for Noncardiac Surgery  
Class III  
Noninvasive testing is not useful for patients undergoing low-risk noncardiac surgery. (Level of Evidence: C) |
| 74. Intermediate-risk surgery  
≥ 1 clinical risk factor | 2007 Guidelines on Perioperative Cardiovascular Evaluation and Care for Noncardiac Surgery  
Class IIB  
Noninvasive stress testing may be considered for patients with at least 1 to 2 clinical risk factors and poor functional capacity (less than 4 METs) who require intermediate-risk or vascular surgery if it will change management. (Level of Evidence: B) |
| 75. Vascular surgery  
1 clinical risk factor | 2007 Guidelines on Perioperative Cardiovascular Evaluation and Care for Noncardiac Surgery  
Class IIB  
Noninvasive stress testing may be considered for patients with at least 1 to 2 clinical risk factors and poor functional capacity (less than 4 METs) who require intermediate-risk or vascular surgery if it will change management. (Level of Evidence: B) |

76. Kidney transplant

77. Liver transplant*

* Renal transplant is assumed to be similar to other intermediate risk surgery, and therefore, it is not presented separately.
General References

2007 Guidelines on Perioperative Cardiovascular Evaluation and Care for Noncardiac Surgery
Section 4: Determine Exercise LEVEL Prior to Initiation of Exercise Prescription or Cardiac Rehabilitation

Table 4.1 Exercise Prescription

<table>
<thead>
<tr>
<th>Guideline Recommendations</th>
</tr>
</thead>
<tbody>
<tr>
<td>76. No prior revascularization</td>
</tr>
</tbody>
</table>

Table 4.2 Cardiac Rehabilitation (Able to Exercise)

<table>
<thead>
<tr>
<th>Guideline Recommendations</th>
</tr>
</thead>
<tbody>
<tr>
<td>79. Post revascularization (PCI or CABG)</td>
</tr>
<tr>
<td>CLASS IIa In patients entering a formal cardiac rehabilitation program after PCI, treadmill exercise testing is reasonable. (Level of Evidence: C)</td>
</tr>
<tr>
<td>80. Heart failure</td>
</tr>
</tbody>
</table>

General References