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Challenges in the Diagnosis of IHD Using Different Modalities

Challenges in the Diagnosis of IHD

- **Rapid and extensive changes have occurred in the practice of cardiology, especially in the development and utilization of imaging**
- **Enhanced radionuclide imaging techniques; advances in echocardiography; the development of cardiac magnetic resonance and cardiac computed tomography techniques have revolutionized how patients are diagnosed.**
- **Although these developments have resulted in direct patient benefits, including improved survival and enhanced quality of life, they have been accompanied by increases in resource utilization and healthcare costs.**

Challenges in the Diagnosis of IHD

- **After injuries, chest pain is the second most common reason for adults to present to the emergency department**
- **Chest pain remains a diagnostic challenge in the ED and outpatient setting and requires thorough clinical evaluation.**
- **Although the cause of chest pain is often noncardiac, coronary artery disease (CAD) affects >18.2 million adults in the United States and remains the leading cause of death for men and women**
- **Of all ED patients with chest pain, only 5.1% will have an acute coronary syndrome (ACS), and more than half will ultimately be found to have a noncardiac cause**

Recommendation for Physical Examination		
COR	**LOE**	**Recommendation**
1	**C-EO**	1. In patients presenting with chest pain, a focused cardiovascular examination should be performed initially to aid in the diagnosis of ACS or other potentially serious causes of chest pain (eg, aortic dissection, PE, or esophageal rupture) and to identify complications.

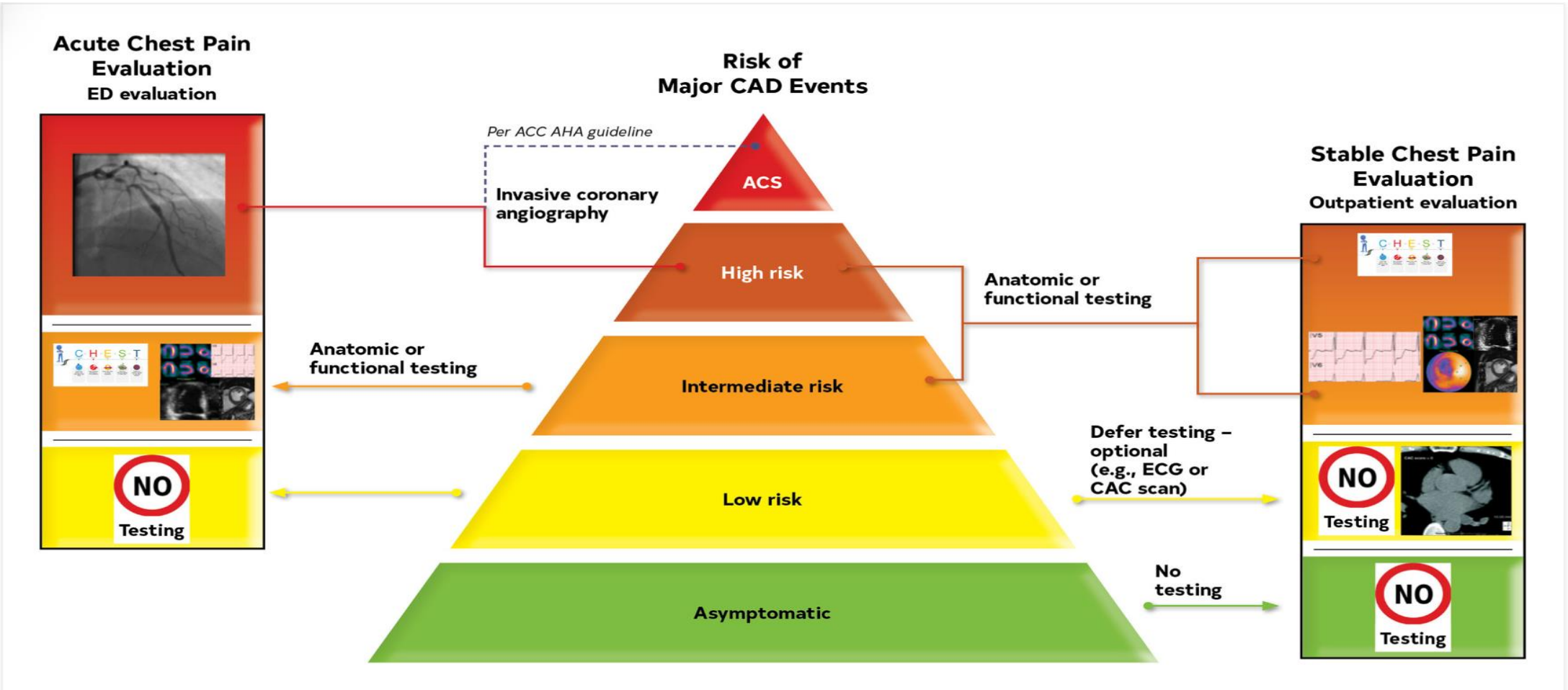
Diagnostic Testing

- **Anatomic Testing**
- **Coronary Computed Tomography Angiography**
- CCTA can visualize and help to diagnose the extent and severity of nonobstructive and obstructive CAD, as well as atherosclerotic plaque composition and high-risk features
- **.Invasive Coronary Angiography**
- defines the presence and severity of a luminal obstruction of an epicardial coronary artery, including its location, length, and diameter, as well as coronary blood flow.[1]
- For ICA, the primary goal is the characterization and detection of a high-grade obstructive stenosis to define feasibility and necessity of percutaneous or surgical revascularization

Diagnostic Testing

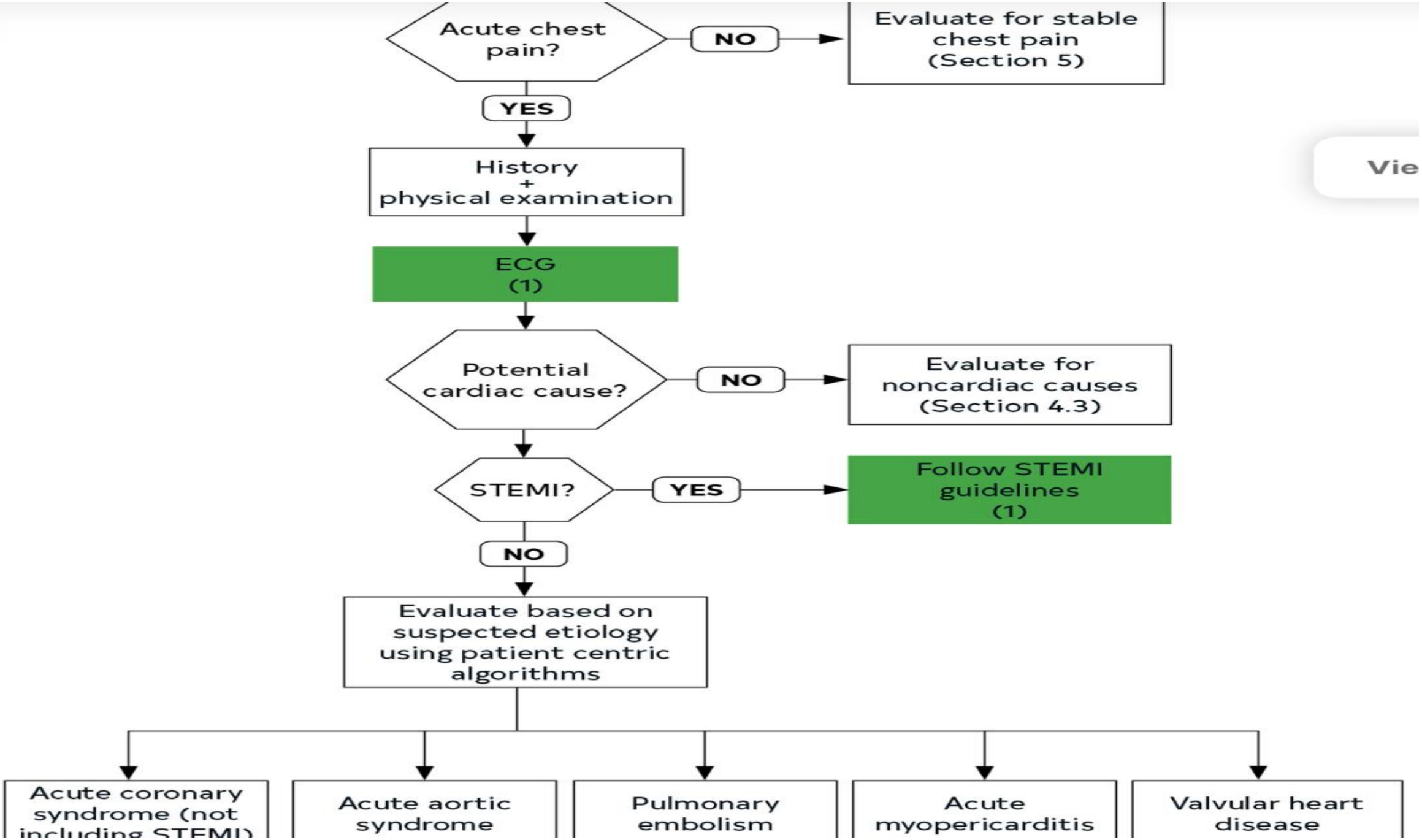
- **Exercise ECG**
- **Echocardiography/Stress Echocardiography**
- **Stress Nuclear (PET or SPECT) Myocardial Perfusion Imaging**
- **Cardiovascular Magnetic Resonance Imaging**

Cardiac Testing General Considerations



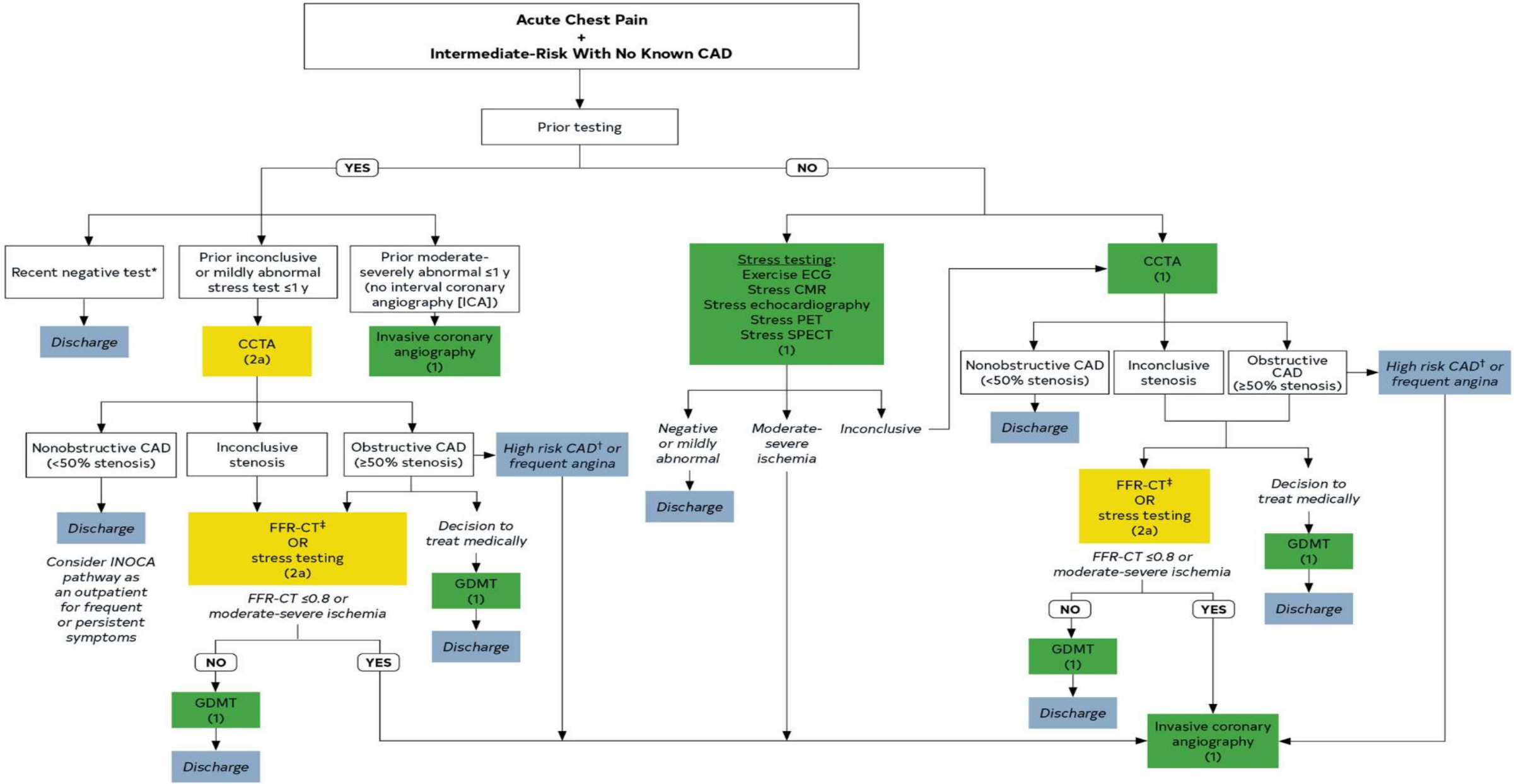
Challenges in the Diagnosis of IHD

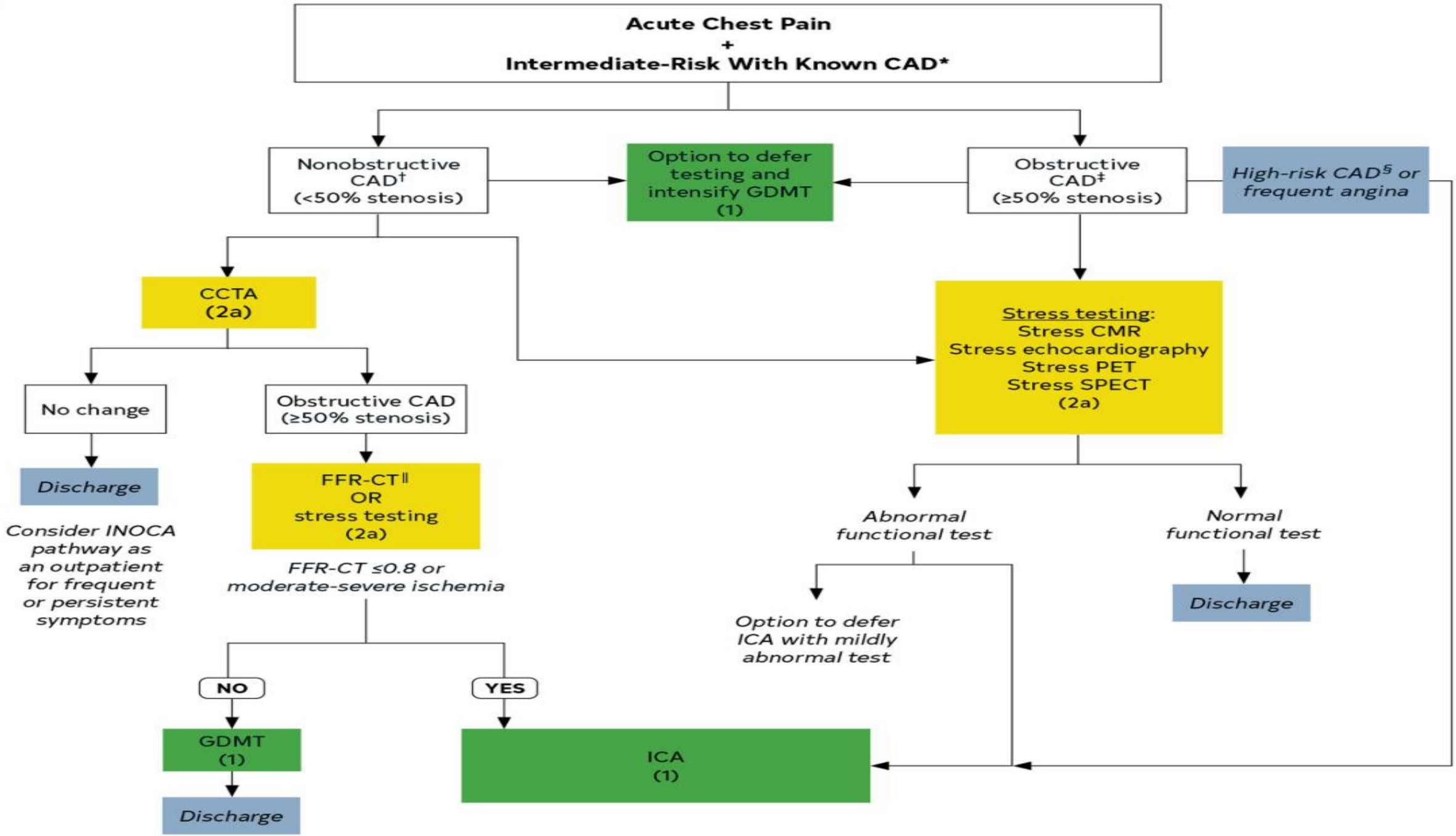
- **ACS (acute coronary syndrome)**
- **chest discomfort is severe and has at least one of three features:**
- **(1) it occurs at rest (or with minimal exertion), lasting >10 minutes;**
- **(2) it is of relatively recent onset (i.e., within the prior one month); and/or**
- **(3) it occurs with a crescendo pattern (i.e., distinctly more severe, prolonged, or frequent than previous episodes).**

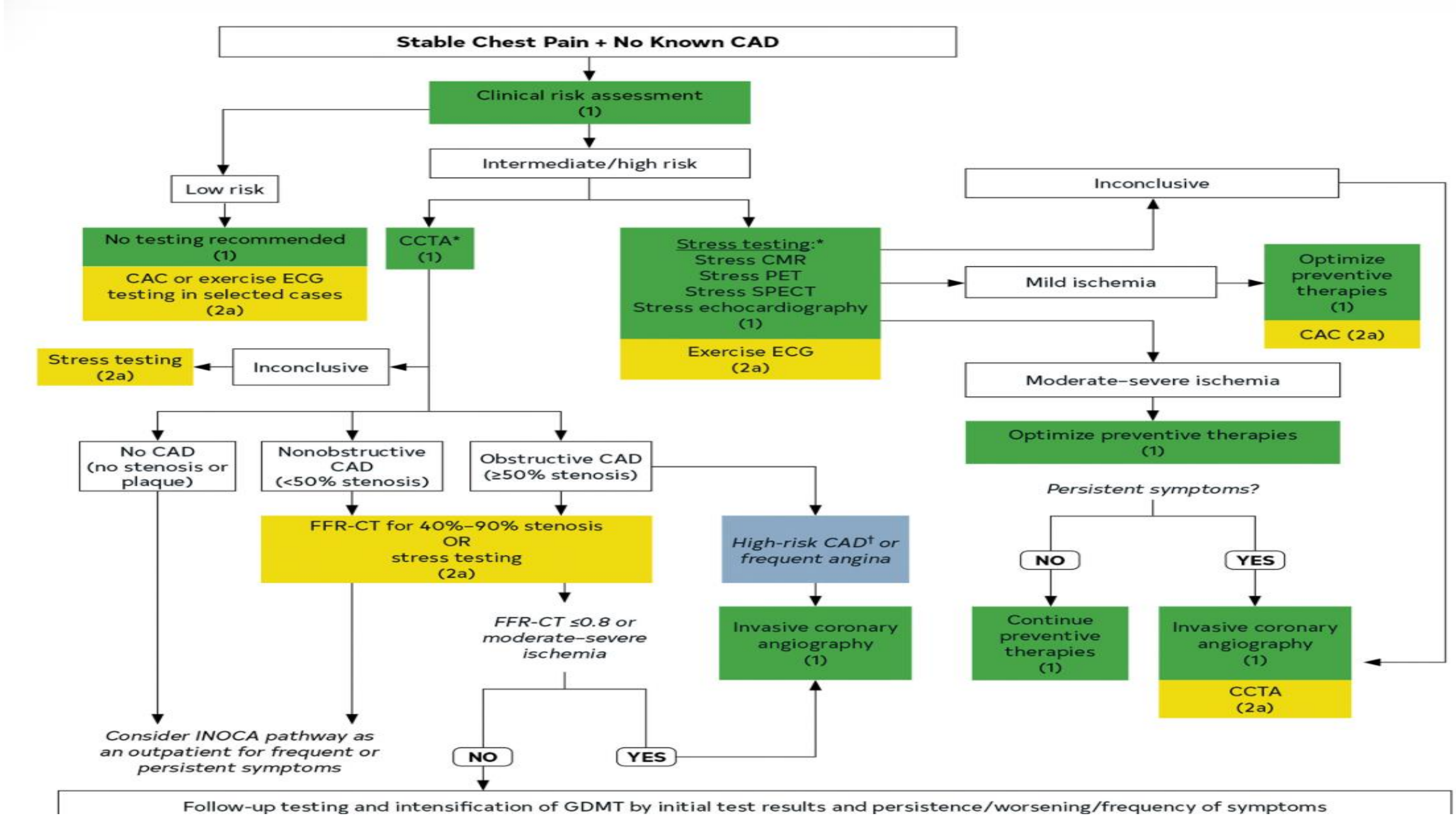

Acute chest pain?
NO
Evaluate for stable chest pain (Section 5)
YES
History + physical examination
ECG (1)
Potential cardiac cause?
NO
Evaluate for noncardiac causes (Section 4.3)
STEMI?
YES
Follow STEMI guidelines (1)
NO
Evaluate based on suspected etiology using patient centric algorithms
Acute coronary syndrome (not including STEMI)
Acute aortic syndrome
Pulmonary embolism
Acute myopericarditis
Valvular heart disease

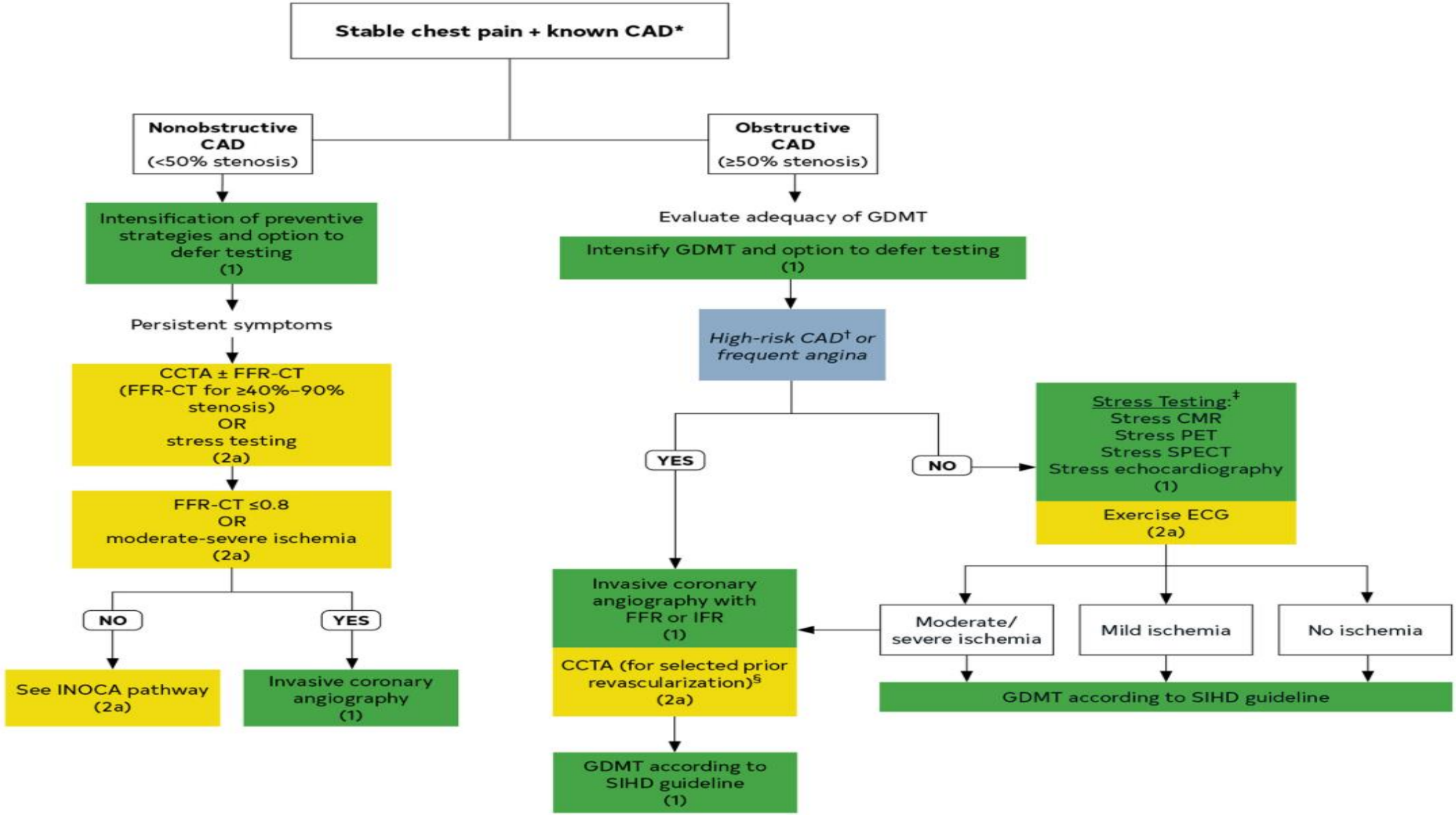
Recommendations for High-Risk Patients, Including Those With High-Risk Findings on CCTA or Stress Testing

1	B-NR	1. For patients with acute chest pain and suspected ACS who have new ischemic changes on electrocardiography, troponin-confirmed acute myocardial injury, new-onset left ventricular systolic dysfunction (ejection fraction <40%), newly diagnosed moderate-severe ischemia on stress testing, hemodynamic instability, and/or a high clinical decision pathway (CDP) risk score should be designated as high risk for short-term MACE.[1-3]
1	C-EO	2. For patients with acute chest pain and suspected ACS who are designated as high risk, ICA is recommended.[4-7]


Acute Chest Pain
+
Intermediate-Risk With No Known CAD
Prior testing
YES
NO
Recent negative test*
Discharge
Prior inconclusive or mildly abnormal stress test ≤1 y
CCTA (2a)
Prior moderate-severely abnormal ≤1 y (no interval coronary angiography [ICA])
Invasive coronary angiography (1)
Nonobstructive CAD (<50% stenosis)
Discharge
Consider INOCA pathway as an outpatient for frequent or persistent symptoms
Inconclusive stenosis
FFR-CT‡ OR stress testing (2a)
FFR-CT ≤0.8 or moderate-severe ischemia
NO
GDMT (1)
Discharge
YES
Obstructive CAD (≥50% stenosis)
High risk CAD† or frequent angina
Decision to treat medically
GDMT (1)
Discharge
Stress testing:
Exercise ECG
Stress CMR
Stress echocardiography
Stress PET
Stress SPECT
(1)
Negative or mildly abnormal
Discharge
Moderate-severe ischemia
Inconclusive
CCTA (1)
Nonobstructive CAD (<50% stenosis)
Discharge
Inconclusive stenosis
Obstructive CAD (≥50% stenosis)
High risk CAD† or frequent angina
FFR-CT‡ OR stress testing (2a)
FFR-CT ≤0.8 or moderate-severe ischemia
NO
GDMT (1)
Discharge
YES
Decision to treat medically
GDMT (1)
Discharge
Invasive coronary angiography (1)


Acute Chest Pain
+
Intermediate-Risk With Known CAD*
Nonobstructive CAD† (<50% stenosis)
Option to defer testing and intensify GDMT (1)
Obstructive CAD‡ (≥50% stenosis)
High-risk CAD§ or frequent angina
CCTA (2a)
Stress testing:
Stress CMR
Stress echocardiography
Stress PET
Stress SPECT
(2a)
No change
Obstructive CAD (≥50% stenosis)
Discharge
Consider INOCA pathway as an outpatient for frequent or persistent symptoms
FFR-CT‖ OR stress testing (2a)
FFR-CT ≤0.8 or moderate-severe ischemia
Abnormal functional test
Normal functional test
Option to defer ICA with mildly abnormal test
Discharge
NO
YES
GDMT (1)
ICA (1)
Discharge


Stable Chest Pain + No Known CAD
Clinical risk assessment (1)
Low risk
Intermediate/high risk
No testing recommended (1)
CAC or exercise ECG testing in selected cases (2a)
CCTA* (1)
Stress testing:* Stress CMR Stress PET Stress SPECT Stress echocardiography (1)
Exercise ECG (2a)
Inconclusive
Mild ischemia
Optimize preventive therapies (1)
CAC (2a)
Moderate–severe ischemia
Optimize preventive therapies (1)
Stress testing (2a)
Inconclusive
No CAD (no stenosis or plaque)
Nonobstructive CAD (<50% stenosis)
Obstructive CAD (≥50% stenosis)
FFR-CT for 40%–90% stenosis OR stress testing (2a)
High-risk CAD† or frequent angina
Invasive coronary angiography (1)
FFR-CT ≤0.8 or moderate–severe ischemia
Persistent symptoms?
NO
YES
Continue preventive therapies (1)
Invasive coronary angiography (1)
CCTA (2a)
Consider INOCA pathway as an outpatient for frequent or persistent symptoms
NO
YES
Follow-up testing and intensification of GDMT by initial test results and persistence/worsening/frequency of symptoms


Stable chest pain + known CAD*
Nonobstructive CAD (<50% stenosis)
Obstructive CAD (≥50% stenosis)
Intensification of preventive strategies and option to defer testing (1)
Persistent symptoms
CCTA ± FFR-CT (FFR-CT for ≥40%–90% stenosis) OR stress testing (2a)
FFR-CT ≤0.8 OR moderate-severe ischemia (2a)
NO
YES
See INOCA pathway (2a)
Invasive coronary angiography (1)
Evaluate adequacy of GDMT
Intensify GDMT and option to defer testing (1)
High-risk CAD† or frequent angina
YES
NO
Invasive coronary angiography with FFR or IFR (1)
CCTA (for selected prior revascularization)§ (2a)
GDMT according to SIHD guideline (1)
Stress Testing:‡ Stress CMR Stress PET Stress SPECT Stress echocardiography (1)
Exercise ECG (2a)
Moderate/ severe ischemia
Mild ischemia
No ischemia
GDMT according to SIHD guideline

Warranty Period for Prior Cardiac Testing

Test Modality	Result	Warranty Period
Anatomic	Normal coronary angiogram CCTA with no stenosis or plaque	2 y
Stress testing	Normal stress test (given adequate stress)	1 y

Thank You for Your Attention