

STRESS TESTING: WHAT EVERY TECHNOLOGIST NEEDS TO KNOW

High Risk Features

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Contraindications

Absolute

Exercise and vasodilator

- SBP <90 mmHg
- Uncontrolled hypertension: SBP >200 mmHg and/or DBP >110 mmHg
- Unstable angina, ACS, or <2-4 days after AMI (adenosine may be reasonable in rare cases)
- Acute decompensated heart failure
- Pregnancy
- Uncontrolled tachyarrhythmia, acute pericarditis/myocarditis, acute pulmonary embolism, severe pulmonary hypertension

Vasodilator

- Second degree AV block (Mobitz type 2) or third-degree AV block, sinus node dysfunction, or symptomatic bradycardia without a functioning pacemaker
- Patients with bronchospastic lung disease with active wheezing
- Known hypersensitivity to stress agent

Relative

Exercise and vasodilator

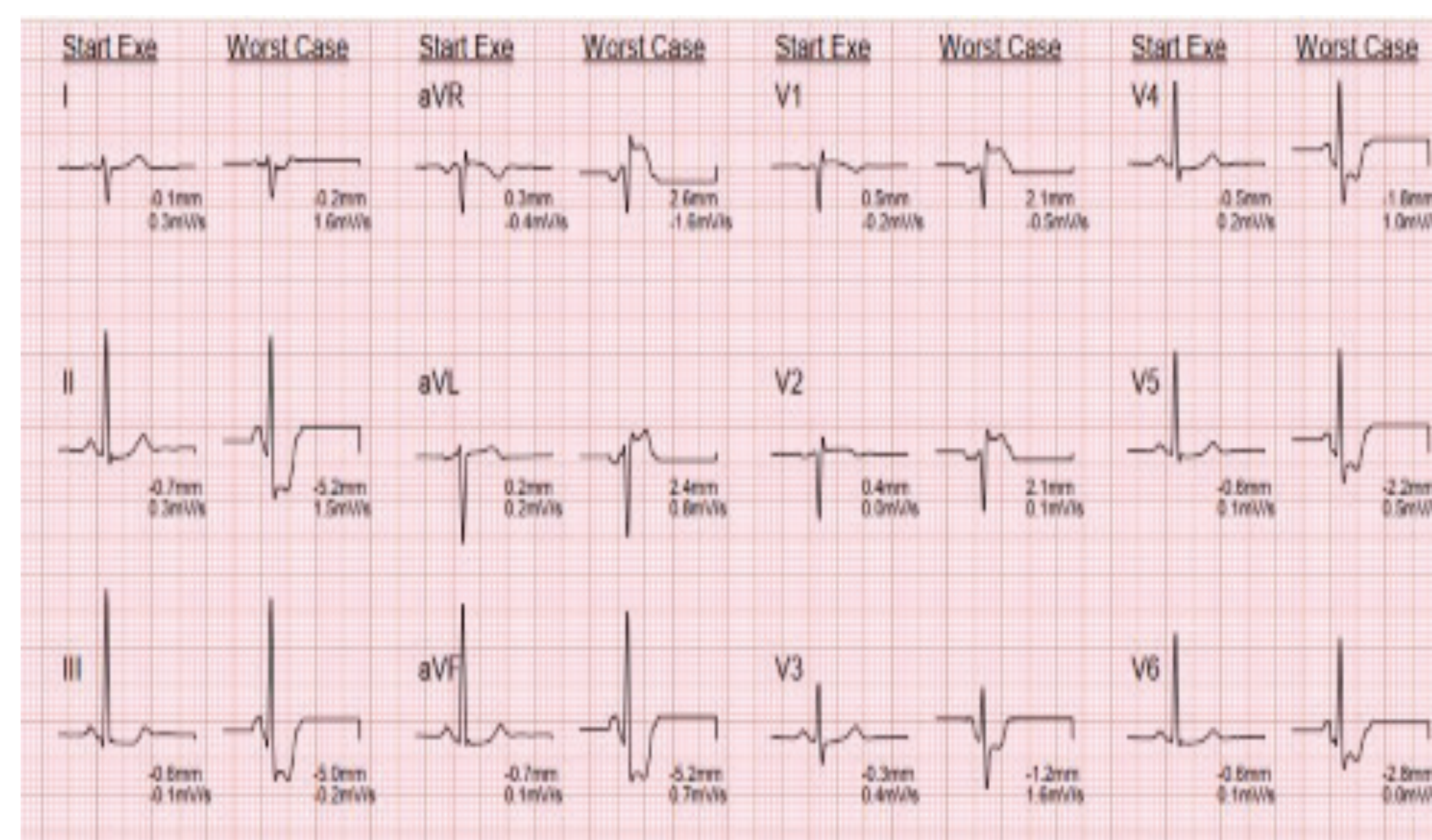
- Severe aortic stenosis (especially with vasodilator, absolute if symptomatic)
- Left ventricular (LV) outflow tract obstruction or known left main disease
- Acute medical illness or electrolyte abnormality

Vasodilator

- Profound asymptomatic sinus bradycardia with heart rate <40 bpm or Mobitz Type 1 second-degree AV block (Wenckebach)
- Ingestion of caffeine within 12 hours

High Risk Clinical Features

- High risk signs/symptoms: typical angina, unstable arrhythmia, hypoxia
- Exercise induced ST elevation >1 mm without Q waves, horizontal/down-sloping ST depression (≥ 2 -3 mm), or sustained ventricular tachycardia
- Exercise induced hypotension (drop in systolic blood pressure of > 10 mmHg from rest)
- Offer caffeine, nitroglycerin, beta blockers, and/or aminophylline to relieve any severe symptoms with appropriate supervision
- Consult supervising physician as needed before discharge.



Marked stress induced ST-depressions with ST-elevation in aVR, V1, V2, and aVL

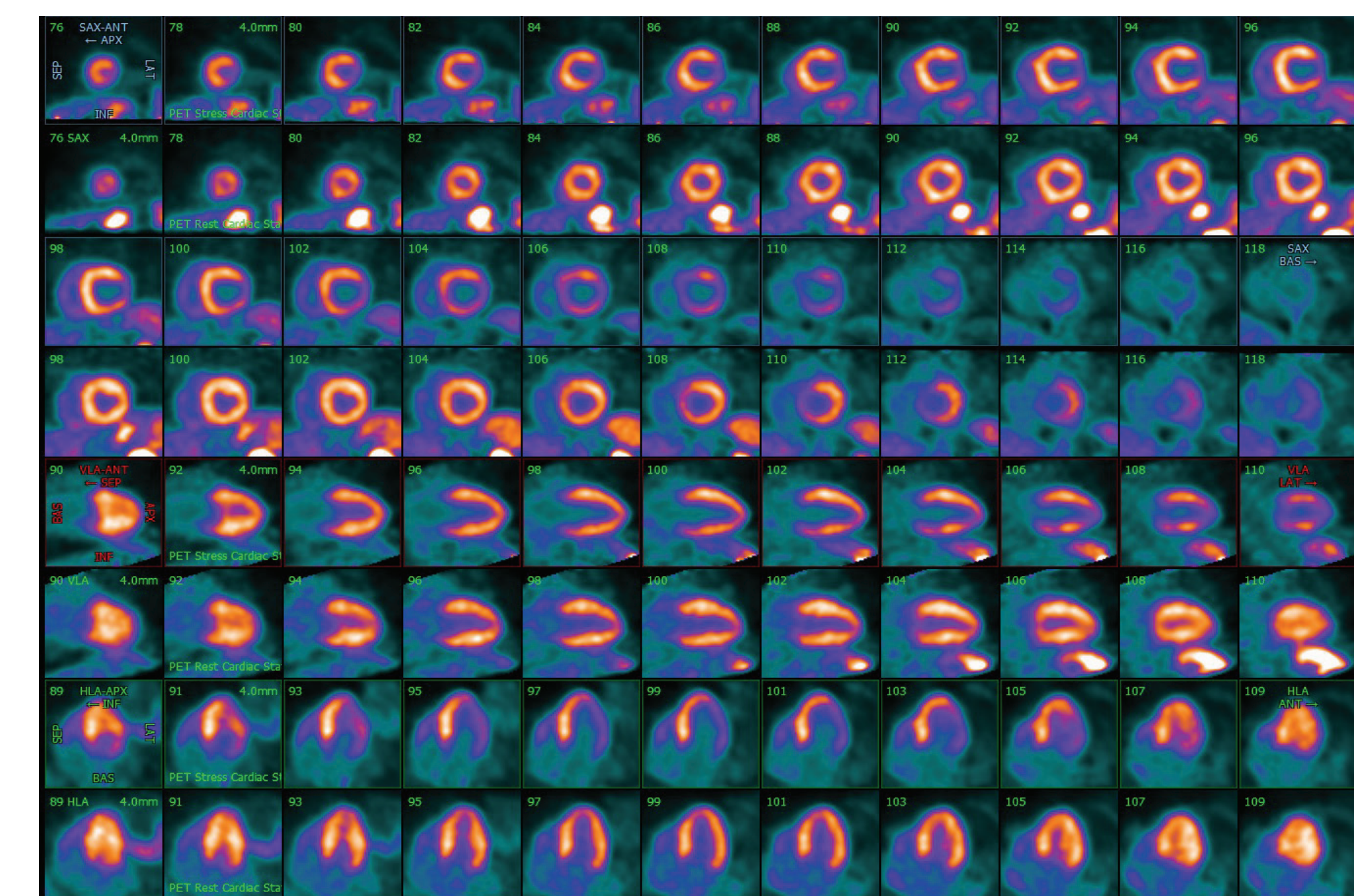
DBP: diastolic blood pressure; SBP: systolic blood pressure, ACS: acute coronary syndrome; AMI: acute myocardial infarction; TID: transient ischemic dilation; CAD: coronary artery disease; MBFR: myocardial blood flow reserve; PET: positron emission tomography; EF: ejection fraction; MPI: myocardial perfusion imaging

High Risk Imaging Features

- **TID:** suggests significant CAD
- **Decrease in LV EF with perfusion defects** (>5% with stress in ^{82}Rb PET)
- **Severe ischemia with symptoms:** images reviewed by physician prior to discharge

PET specific:

- **Abnormal (<1.8) MBFR** in the absence of known CAD, prior revascularization, or perfusion abnormality: suspicious for obstructive multi-vessel CAD
- **Lack of augmentation (<1.2) in MBFR** in absence perfusion defects: further raises suspicion for multi-vessel CAD, severe microvascular dysfunction, or non-response due to vasodilator inhibition (caffeine intake)



Abnormal PET MPI with reversible lateral wall ischemia and a TID ratio of 1.4, increasing the likelihood of significant CAD