Evaluation/Treatment of the Outpatient with Angina

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Objectives

• Review factors that influence chest pain in the outpatient clinic
• Compare and contrast the different options for stress testing, including strengths, weaknesses, and relative costs
• Discuss medical therapy for chronic ischemic heart disease and stable angina
Audience Response Question
Question

The following 4 patients present to your practice with chest pain. For which patient would a noninvasive stress test be most appropriate?

1. 52 yo Male, Hx DM, HTN, dyslipidemia reports “aching” in the L shoulder, back/neck, fatigue while doing construction work on his home

2. 30 yo Female, competitive distance runner, with bilateral pain in the lower ribs, worse with deep inspiration.

3. 64 yo Male, Hx HTN, dyslipidemia, and tobacco use has a 4 day Hx of chest tightness, dyspnea when attempting to walk more than 20 feet.

4. 75 yo Female in your office with 4/10 pain L chest started 4 hours ago while sweeping garage. Pain persists during the exam.
Which Patient Should HAVE a Stress Test?

• Angina with intermediate pre-test probability of ischemic CAD
• Pre-op for noncardiac surgery (if Hx CAD, poor functional level)
• CAD patients on medical therapy to assess treatment efficacy
• Assess borderline “non-culprit” lesion discovered on cath during PCI
• 5 years post CABG (one-time)
• Valvular heart disease to determine functional level
• Cardiomyopathy/Heart Failure to assess myocardial viability
HEALTH CARE IN THE NEW MILLENNIUM:

Good morning, Mr. Smith. My lawyers and I would like to know how you and your lawyers are feeling today.

You've said enough, Doc.

You don't have to answer that, Mr. Smith.
Which Patient Should NOT Get a Stress Test?

- Acute Coronary Syndromes: AMI, STEMI, NSTEMI, unstable angina (although okay after initial stabilization)
- Patient with very high probability CAD, consistent symptoms
- Patient with no or low probability of CAD, consistent atypical symptoms
- Asymptomatic patient without a Hx of CAD
Outpatient Evaluation of Chest Pain

Chest Pain Etiology in Primary Care Clinic

- Stable Angina
- Acute MI, USA
- Other Cardiac
- Musculoskeletal
- Gastrointestinal
- Psychiatric
- Pulmonary
- Other/Unknown

Differential Diagnosis

• Chest Wall
  • Cervical disc dz
  • Costochondritis
  • Fibrositis/fibromyalgia
  • Shingles
  • Neuropathic
  • fracture

• Cardiovascular (NON-coronary)
  • AS, MS
  • Mitral prolapse
  • Aortic dissection
  • Peri or myocarditis
  • “Tako tsubo” (stress CM)

• Pulmonary
  • Pleuritis
  • PE
  • Pneumonia
  • PTX
  • asthma

• GI
  • Biliary
  • Esophageal
  • Pancreatitis
  • PUD/GERD

• Psychiatric
Dear Dad, I'm so glad that we are staying with you! I miss you! I hope you and mom will git back together. Because my life is not worth it. Because...

Dear Mrs. McMahon,
Your a good teacher but not my most favorite.

I lost my tooth on Oct 23rd at 5:00 PM. I lost my tooth in pizza. I lost both today. You owe me $1.00 not to be hard but I need money.

Annisa
Which Stress Test is Best for My Patient?

- Age
- Gender
- ECG (LBBB, pacemaker, acute MI)
- Drugs/Diet (caffeine, β-blocker, Ca-channel blocker, digoxin)
- Ability to Exercise
- Body habitus
- History of prior disease, MI, or revascularization
Audience Response Questions
Question

• You see a 63 yo F with obesity, DM, who has been having a “toothache in chest” and axilla for past 6 weeks. She walks daily and gardens. Had stent 4 years ago. BMI=36. EKG shows sinus rhythm, nonspecific ST segment changes. The best stress test?

1. Exercise ECG
2. Exercise stress Echo
3. Dobutamine stress Echo
4. Exercise stress SPECT
5. Pharmacologic stress PET
Question

• A 36 yo M, high school football coach and scout leader requests BSA physical prior to leading a 30 mile backpacking trek in the wilderness. Works out at the gym 3 nights/week. Occasional L scapular pain during/after workout. FHx: Father has stent. BMI=28. EKG normal. Best stress test?

1. Exercise ECG
2. Exercise stress Echo
3. Dobutamine stress Echo
4. Exercise stress SPECT
5. Pharmacologic stress PET
Stress Test Options

- Exercise preferred whenever possible
- Adenosine better if pacemaker or LBBB

Exercise EKG
(+): inexpensive, readily available, prognostic data
(-): lower sensitivity, requires normal resting EKG

Echo (Exercise/DBA)
(+): best specificity, additional data, moderate cost, travel
(-): less sensitive, variable test reliability, difficult windows

Nuclear (Exercise or Adenosine)
(+): best sensitivity, best reliability, quantify infarct & ischemia
(-): modest radiation risk, cost, soft tissue attenuation

Coronary CTA
(+): anatomy, LV function, other
(-): radiation, contrast, ? Lesion significance, cost

Cardiac MRI
(+): structure, viability, perfusion
(-): cost, availability
SPECT versus PET Stress Test
Super SPECT

• Specifically engineered for cardiac SPECT applications
  • special collimation
  • software
  • 4X higher resolution; more 3D processed information

• Dose reduction as much as 1/2 of current doses
  • From 12 mSV (current) to 6 mSV (rest + stress)
  • Acquisition time cut in ½: 4 to 8 min per scan.

• 16 slice CT allows qualitative and quantitative coronary calcium scores (replaces non-diagnostic CT currently available)

• Large bore camera allows scanning higher BMI patients; decreased anxiety in claustrophobic patients
Intermountain Heart Institute Cardiac PET Program

**PET**
- Higher Sensitivity (87-95%)
- Higher Specificity (93%)
- Higher Accuracy (89%)
- Higher image resolution
- Advantages:
  - Obese patients
  - “balanced” ischemia
- Reduced radiation exposure
- Complete study in 30 minutes
- Additional information

**SPECT**
- Modest Sensitivity (82%)
- Fair Specificity (73%)
- Fair Accuracy (79%)
- Fair image resolution
- Advantages
  - Exercise optional
  - Radionuclide cost/availability
- Complete study in ~120 minutes
- Limited to ischemia, function
Limited resolution in small hearts
Stress-Rest Function “EF Reserve”
Quantitative Blood Flow
Coronary Artery Calcium: “Freebie”
Intermountain Study: SPECT vs. PET Stress

- 2,483 SPECT stress (2012)
- 2,178 PET stress (2013)
- Selected pts. w/ cath <30 days from stress test:
  - 197 SPECT
  - 200 PET
- 2 readers blinded to initial interpretation reviewed stress and cath

![Bar chart comparing SPECT and PET]
Chronic CAD/Stable Angina: Outpatient Management
Chronic/Stable CAD: Guidelines

- Smoking Cessation
- Physical activity 5 days/week; BMI <25
- Hgb A1C <7%
- Flu shot
- BP reduction (<140/90, or <130/80 dm/cri)
  - ACEI/ARB (class Ib, 14-22% RRR death*)
  - B-Blocker (class IIa, 23 % RRR death**)
- Cholesterol reduction (LDL <70 mg/dL)
  - Statin (+/- omega-3, fibrate, niacin)
- ASA (or clopidogrel if intolerant)

*HOPE & EUROPA trials; **B-blocker meta-analysis in Braunwald’s Heart Disease
For a better start in life
start COLA earlier!

Promotes Active Lifestyles
Boosts Personality
Gives Body Essential Sugars
Smoking Cessation Algorithm

**Ask and document pt’s tobacco use status**
- Recent Quitter (<6 months)
- Current User
  - **Advisse**: Provide a strong, personalized message to quit using tobacco
  - **Assess**: readiness to quit in next 30 days
    - **Ready**: Assist
      - Negotiate a plan
      - STAR**
        - Set quit date
        - Tell family, friends, and coworkers about it
        - Anticipate challenges: withdrawal, breaks
        - Remove tobacco from the house, car, and social life
      - Discuss pharmacotherapy
      - Social support
      - Provide educational materials
    - **Not Ready**: Prevent Relapse
      - Congratulate successes
      - Encourage to remain tobacco-free
      - Discuss benefits experienced by patient
      - Address weight gain, negative mood, and lack of support
  - **Arrange**: follow-up to check plan or adjust meds
    - Call right before and after quit date
    - Weekly follow-up x 2 weeks, then monthly x 6 months
    - Ask about difficulties (withdrawal, depressed mood)
    - Build upon successes
    - Seek commitment to stay tobacco-free

**Increase Motivation**
- Relevance to patients personal situation
- Risks: short and long term, environmental
- Rewards: potential benefits of quitting
- Roadblocks: identify barriers and potential solutions
- Repetition: repeat motivational intervention
- Reassess readiness to quit

Beyond β-blockers & Nitro

• Ranolazine
• Other Rx
• Spinal cord stimulator
• TMR