



Women and Coronary Artery Disease – Where Are We Now?

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Historical Perspective

“Another point to remember is that angina pectoris is, like gout, a disease of men, and not women. When it does manifest itself in females, as is occasionally the case, it is often so confused with the common and frequent pains in the left side, due to flatulence or other causes, to which that sex is especially prone, that its recognition may be a matter of some difficulty.”

Prof. P. Brouardel and F. Lucas Benham, MD 1902



Statistics

- Compared to men, women are more likely to:
 - die from MI
 - die within one year of MI
 - have a second MI within 6 years
 - become disabled from CHF
 - die from cardiac arrest before reaching hospital



Evidence-Based Guidelines for Cardiovascular Prevention in Women

- Risk Status: HIGH
 - Established coronary heart disease
 - Cerebrovascular/peripheral arterial dz
 - AAA
 - ESRD
 - DM
 - 10-yr Framingham global risk >20%



- **Risk Status: AT RISK**

- >1 major risk factor for CVD including:

- Tobacco use
- Poor diet
- Physical inactivity
- Obesity
- FHx premature CVD
- HTN
- Dyslipidemia
- Subclinical vascular dz (eg. Coronary calcification)
- Metabolic syndrome
- Poor exercise capacity on GXT and/or abnormal heart rate recovery after stopping exercise



- Risk Status: **OPTIMAL RISK**

- Framingham global risk <10%,
healthy lifestyle with no risk factors

However, a low score
does not ensure low risk



Class I Lifestyle Recommendations

- Tobacco cessation
- Heart-healthy eating pattern
- Regular physical activity
- Weight management



At Risk or Optimal Risk Women

- **Class I Recommendations:**

- BP control
- LDL therapy in select women

- **Class II Recommendations:**

- HDL, non-HDL and TG therapy in select women
- Aspirin (81-100 mg) if >65 yrs old, BP controlled, low risk of bleeding. In <65 yrs old for ischemic stroke protection



High-Risk Women Recommendations

- **Class I:**
 - BP control
 - LDL therapy (goal <70)
 - Aspirin (75-325mg), antiplatelet tx
 - Beta blocker
 - ACE-I/ARB
 - Glycemic control in diabetics
 - Aldosterone blocker in select women



High-Risk Women Recommendations

- **Class II:**
 - LDL < 70 in very-high risk women
 - HDL/non-HDL therapy
 - Omega-3 fatty acids
 - Depression treatment



Not Recommended

- Hormone therapy for primary or secondary CVD prevention
- Antioxidants (Vitamins E,C, beta carotene)
- Folic acid with/without B6 and B12 supplementation
- Routine use of aspirin in healthy women <65 yrs old to prevent MI



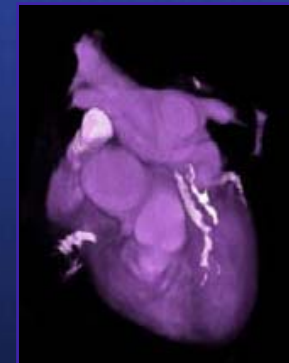
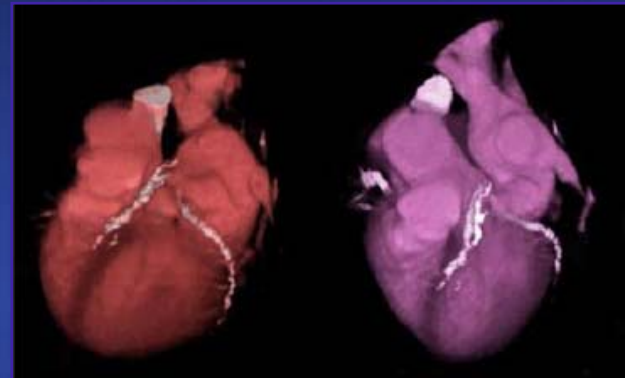
Limitations to Framingham Risk Assessment

- Focuses on short-term risk of CVD (10 yr)
- Does not include FHx (does include age, smoking, BP, and lipid levels)
- Underestimates dz in non-white population



Newer Markers

- Coronary artery calcium scoring
- hsCRP
- Anemia
- Cardiovascular MR assessment
- Brachial artery reactivity
- Carotid IMT



Shaw LJ et al JACC
2006;47:4S-20S
Mieres JH et al Circ

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Stress Testing

- Exercise EKG:
 - Women with indeterminate pretest risk of CVD, normal resting EKG, capable of maximum exercise
 - EKG changes with exercise have decreased accuracy due to more frequent resting ST-T changes, lower EKG voltage, and hormonal factors



Exercise EKG

- Sensitivity: 61% in women, 72% in men
- Specificity: 70% in women, 77% in men
- Duke treadmill score can improve accuracy
- Also consider maximal exercise capacity and heart rate recovery
- Increased risk of death with reaching <5 METS



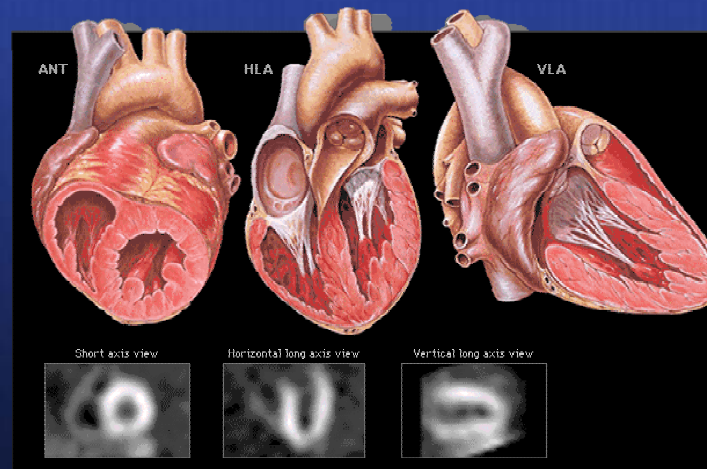
Exercise or Dobutamine Stress Echo

- No gender difference on diagnostic accuracy
- Mean sensitivity 81%
- Mean specificity 84%



SPECT Imaging

- Technical limitations in women due to breast artifact and small LV chamber size
- Sensitivity 87% in women, 91% in men
- Specificity 88% in women, 96% in men



Microvascular Coronary Dysfunction

- 50% of women with CP, ischemia on stress testing, but without obvious CAD by cath
- Increases risk of adverse cardiac events, about 2.5% /yr
- Evaluate by coronary reactivity testing
- Goal of tx: risk reduction with nitrates, beta blockers, CCB, statins



Microvascular Coronary Dysfunction

- Atherosclerotic plaque is not localized but spread throughout arterioles and capillaries, affecting entire vessel circumference
- Erosion/rupture of plaque aggregates can lead to MI, and is more likely to occur after menopause



Abnormal Cardiac Nociception

- No ischemia by stress test, persistent CP, normal coronaries by cath
- CP reproducible by adenosine and dipyridamole infusion during cardiac cath
- Tx: no specific guidelines; imipramine, TENS device



Hormones

- Oral contraceptives
 - Used by 19% of women
 - Average 7-8 mm Hg rise in normotensive women
 - Higher CRP levels
 - Increased risk of MI with pre-existing risk factors such as smoking especially if age >35
 - Consider nonhormonal contraceptive method if high risk



Hormone Replacement Therapy

- HERS and WHI– not effective for primary or secondary prevention and had increased risk of MI within first year, possibly due to plaque instability, and can increase risk of breast cancer, stroke, and venous thromboembolism





THANK YOU!!!

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