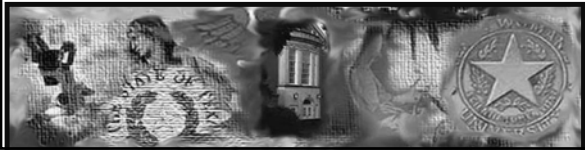


## Women and Heart Disease

Lisa Lilley, MS, WHNP  
Peggy Mancuso, Ph.D., CNM



## How is a woman's heart different?

- Lower ventricular pressure
- Higher ejection fractions
  - Resting higher
  - Exercise testing different (less increase than men)
  - Left ventricle dilates with stress
- Increased clotting-platelet activity greater
- Smaller blood vessels

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## Major Risk Factors

- Diabetes
  - Women with diabetes have greater risk of CAD than men with diabetes
  - Women with diabetes have twice the risk of CAD as women without
  - Insulin resistance also confers increased risk of CAD

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## Major Risk Factors

- Hypertension
  - Most powerful predictor of CAD and CVD
  - Present in 60-80% women over 45
- Lipids
  - Low HDL more predictive of CAD than high LDL in women all ages

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## Major Risk Factors

- Smoking
  - 50% MI's in women attributed to tobacco
  - Risk increases fivefold with 25 cigarettes a day
  - Even small amount of cigarettes increase risk
  - Risk starts to drop with stopping completely
    - Eventually reaches risk for women who have never smoked

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## Major Risk Factors

- Family History of Premature MI
  - First degree male relative over 55
  - First degree female relative over 65
  - Both increase risk

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## Risk Factors

- Obesity
  - Overall obesity a risk factor for females only
  - Abdominal obesity risk factor for both
  - Strong relationship between truncal obesity and insulin resistance

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## Risk Factors

- Sedentary lifestyles
  - Moderate exercise decreases risk in women of all ages
- Family history of heart disease
  - Maternal heart disease before 60 more predictive
  - Higher in Black Americans
- Previous history of infarction

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## Female Risk Factors

- Menopause
  - Blood vessels more friable
  - $< \text{HDL} > \text{LDL}$
  - Increased iron?
  - HRT?



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## Female Risk Factors

- Age greater than 55
- Premature menopause without ERT
- Family history of premature CHD
- Personal history of cardiac symptoms

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## Possible Female Risk Factors

- OCP
  - Does not increase risk in smokers under 30, or nonsmokers over 30
- Type A personality?
- Low education level?
- Cocaine use

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## Possible Female Risk Factors

- C-reactive protein
  - Marker of systemic inflammation
  - Nurses Health Study- elevated levels were independent predictor for CAD even in women with normal lipids

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## Possible Female Risk Factors

- Lipoprotein (a)
  - Framingham Study
  - Strongly associated with atherosclerosis and CAD, especially in women

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## Symptoms Women Have with Heart Attacks

- Angina – most frequent first manifestation
  - Most likely to have pattern associated with stress, sleep and rest instead of physical exertion
- Prinzmetal angina (angina at rest) – rare in both men and women
- Women are more likely to have:
  - SOB
  - GI pain
  - Nausea
  - Fatigue

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## Symptoms of Heart Attack in Women

- Most common presenting symptom in men and women is chest pain



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## Gender Differences in Presentations

- Higher prevalence of ST-T abnormalities
- Vasospasm more common
- Sudden cardiac death:
  - More common in men than women
  - Still accounts for 37% CAD deaths in women
  - 67% all sudden cardiac death in women occurs in women without known history of CAD

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## Common Presentation

- Symptoms Men and Women Have
- Chest pain
- Dizziness
- Limb weakness
- Fainting
- “Cold sweat” more likely in men

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## Women are treated differently!

- 27% of deaths are under age 55
- Treated less aggressively
- Do not get thrombolytics
- Less surgery or other invasive procedures
- Occlude following percutaneous catheterization

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## Problems Diagnosing Women

- Report to ER later than men
- Nonclassical, "GI" symptoms
- Nondemanding, polite
- Denial

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## What can we do?

- Educate women and health care providers
- Research with female participants
- Standards of treatment for women
- Reimburse preventive strategies

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## What can we do?

- Appropriate (smaller) equipment
- Risk factor modification for women
- Appropriate screening
- Reduce time to treatment

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## CAD Classifications

- Class I
  - Asymptomatic
  - No limitation of physical activity
- Class II
  - Slight limitation of physical activity
  - Asymptomatic at rest
  - Symptoms with heavy physical activity

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## CAD Classifications

- Class III
  - Considerable limitations of activity
  - Asymptomatic at rest
  - Symptomatic with minimal activity
- Class IV
  - Severe activity limitations
  - Symptoms with minimal activity
  - May have symptoms at rest

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## Assessment Past Medical History

- Cardiac surgery or hospitalization
- Rheumatic fever
- Unexplained fever
- Swollen joints
- Inflammatory disease
- Chronic Illness

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## Assessment Past Medical History

- Hypertension
- Bleeding disorders
- Hyperlipidemia
- Diabetes
- CAD
- Congenital heart defect

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## Assessment Family History

- Diabetes
- Heart disease
- Hyperlipidemia
- Hypertension
- Congenital heart defects
- Sudden unexplained death in young relatives

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## Assessment Personal-Social History

- Employment
- Environmental hazards
- Emotional stress
- Tobacco
- Nutritional status
- Alcohol

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## Assessment Personal-Social History

- Hypercholesterolemia
- Personality
- Relaxation activities
- Exercise
- Drug use
  - Amyl nitrate
  - Cocaine

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## Diagnosing Cardiac Disease in Women

- 1 out of 3 women may not have angiographic evidence
- Chest pain
  - Dysrhythmias
  - Mitral regurgitation
  - 4th heart sound (atrial gallop)
  - Basilar crackles

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## Testing

- Resting EKG
  - Good test for women
  - ERT changes Q waves
- Exercise EKG
  - High false positive rate (ST depression)
  - Not accurate with single vessel disease
  - Strenuous for elderly
  - Can not raise heart rate

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## Testing

- Thallium Scan
  - Fewer false positives than exercise EKG
  - Still may be false positive because of breasts
  - Expensive & radiation exposure
- Radio-Nuclide Ventriculogram
  - RBC labeled with technetium 99
  - Little diagnostic value in women
  - No EF increase at peak exercise

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## Testing

- Exercise Echocardiogram
  - 90% accurate
  - Detects single vessel disease
- Cardiac Catheterization
  - Gold standard
  - Men 10 times more likely to be tested
- Cardiac Enzymes
  - MI (more research needed)

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## Benign Heart Murmurs in Women

- Systolic
- Grade 1/6 or 2/6
- Short
- May be transmitted to carotids
- “Dub” is normal
- Heard best when supine

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## When do Benign Murmurs Occur?

- Anemia
- Exercise
- Pregnancy
- Thyrotoxicosis
- Fever
- Emotional disturbances

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## Malignant Murmurs (Refer)

- Chest pain
- SOB at rest or exertion
- RHD
- Congestive heart failure
  - Orthopnea
  - Paroxysmal nocturnal dyspnea
  - Pedal edema
  - Wheezing or coughing

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## Malignant Murmurs

- History of previous cardiac disease
- Growth failure
- Cyanosis
- Enlarged or irregular thyroid
- Hypertension
- Severe unexplained anemia (<27%)
- Polycythemia

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## Malignant Murmurs

- All diastolic murmurs
- III/VI or above
- Irregular heart rate or rhythm
- Bruit, heave, click, or tactile thrill
- Inspiratory basilar crackle or wheeze
- Edema
- Jugular vein distention
- Hepatomegaly

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## Malignant Murmurs

- Cardiomegaly
- Intensified by exercise or Valsalva
- Diminished femoral pulses
- Unequal BP in right or left arm
- Friction rub
- Fixed split S-2
- Paradoxical split

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### Image acknowledgments:

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