

Men vs Women: Must Know Facts about Heart Disease

Ramandeep Brar MD, FACC, FHRS

Internal Medicine

Cardiology

Cardiac Electrophysiology



The Heart Truth

- Heart disease is the #1 killer of American women—no matter what their race or ethnicity
- Heart disease kills 1 of every 4 American women
- Heart disease can permanently damage your heart—and your life
- Every 39 seconds an adult dies of heart attack, stroke, or other cardiovascular disease in the U.S. (*CDC Vital Signs, February 2011*)

(<http://www.cdc.gov/vitalsigns>)

Prevalance

- ❖ Worldwide 8.6 million women die from heart disease each year, accounting for a third of all deaths in women.
- ❖ 8 million women in the US are currently living with heart disease; 35,000 are under the age of 65
- ❖ 435,000 American women have heart attacks annually; 83,000 are under the age of 65 with the average age of 70.4 years

Prevalance continued

- ❖ 42% of women who have heart attacks die within one year, compared to 24% of men
- ❖ Under age 50, women's heart attacks are twice as likely as men's to be fatal
- ❖ 267,000 women die each year from heart attacks, which kill six times as many women as breast cancer. Another 31,887 women die each year of congestive heart failure, representing 62.6% of all heart failure deaths

❖ Resource: www.womensheart.org Women's Heart Foundation

Compared to Men....

- 46% of women and 22% of men heart attack survivors will be disabled with heart failure within 6 years
- Women are 2-3 times as likely to die following heart bypass surgery. Younger aged women between the ages of 40-59 years are up to 4 times more likely to die from heart bypass surgery than men the same age

Compared to men...

- Women are twice as likely as men to die within the first few weeks after suffering a heart attack; 38% of women and 25% of men will die within one year of a first recognized heart attack
- Since 1984, more women than men have died each year from heart disease, and the gap between men and women's survival continues to widen

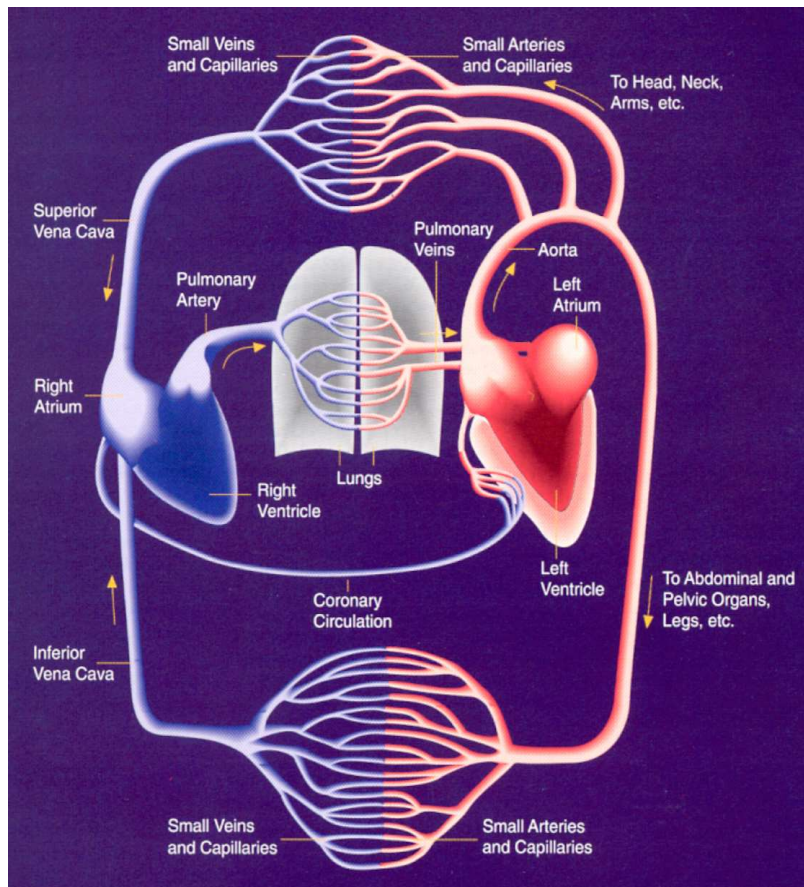
The Heart Truth

- Heart disease is a “now” problem
- “Later” may be too late



What Is Heart Disease?

- Heart doesn't get enough nutrient-rich blood
- Chronic—develops over years
- Atherosclerosis—arteries harden as cholesterol, fat, and other substances build up in artery walls
- Blockage can result in heart attack

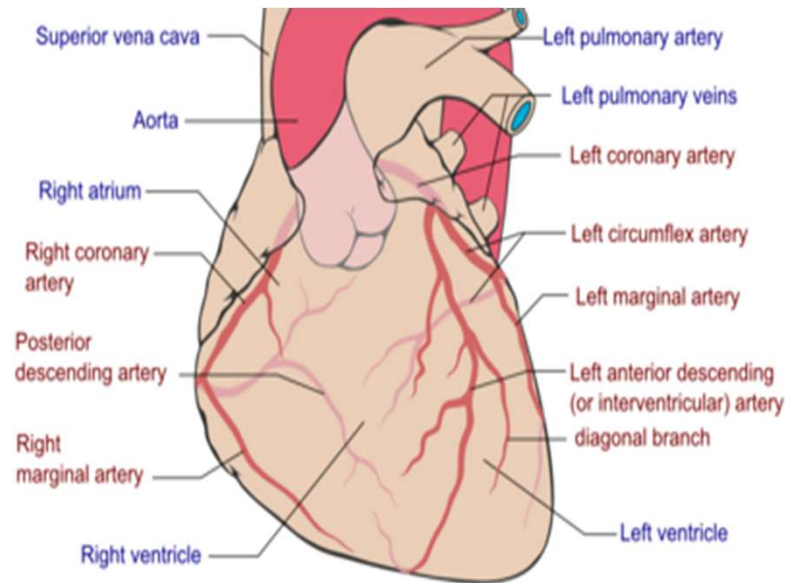


The cardiovascular system comprises the heart, with its four chambers; arteries, in which blood moves away from the heart; veins, in which blood returns to the heart; and a system of capillaries, which transport blood between small arteries and small veins. In this diagram, the heart has been split into two halves to illustrate better the functions of the right and left sides.

Source: Chung, M.K., and Rich, M.W. Introduction to the cardiovascular system. *Alcohol Health and Research World*

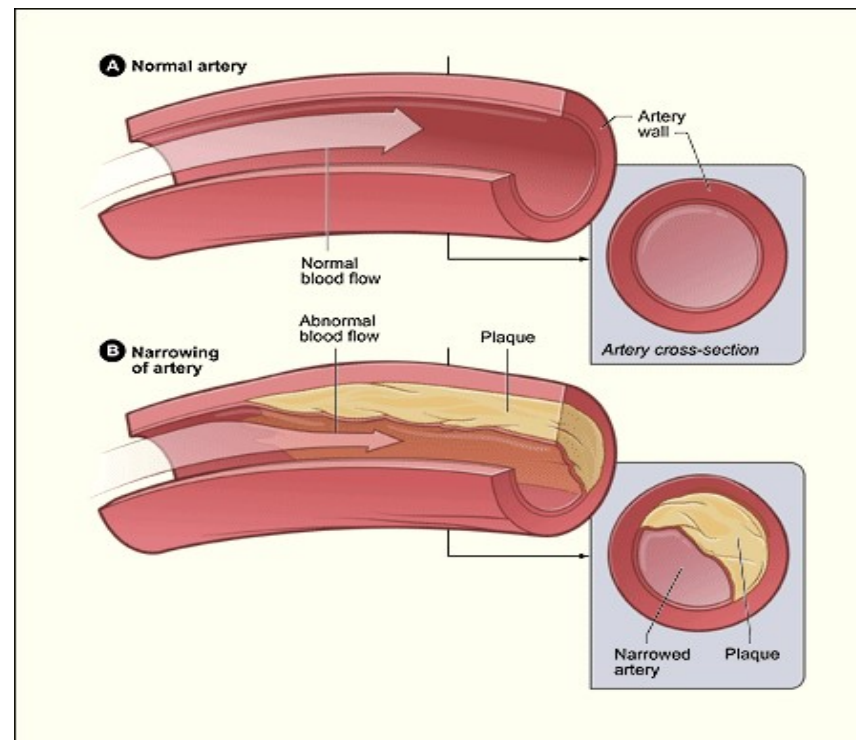
14(4):269–276, 1990.

Coronary Circulation: It's All in the Heart



While the circulatory system is busy providing oxygen and nourishment to every cell of the body, let's not forget that the heart, which works hardest of all, needs nourishment, too. Coronary circulation refers to the movement of blood through the tissues of the heart. The circulation of blood through the heart is just one part of the overall [circulatory system](http://www.fi.edu/learn/heart/systems/coronary.html).

<http://www.fi.edu/learn/heart/systems/coronary.html>



The illustration shows a normal artery with normal blood flow (figure A) and an artery containing plaque buildup (figure B).

Source=http://www.nhlbi.nih.gov/health/dci/Diseases/Hbc/HBC_WhatIs.html

Overview

- The scope of the problem
- Symptoms
- Risk factors
- Prevention, diagnosis, and treatment

The Scope of the Problem

- Coronary Artery Disease (a.k.a. Coronary Heart Disease)
- Cardiovascular Disease
 - CHD: MI, angina, heart failure, coronary death
 - Cerebrovascular dz – CVA, TIA
 - PAD – claudication
 - Aortic disease: atherosclerosis, TAA, AAA

The Scope of the Problem

- Heart disease is the biggest killer of women
- Cardiovascular disease is BY FAR the biggest killer of women
 - Roughly 401,000 deaths/year from CVD (vs. 386,000 men)
 - 176,255 deaths/year from CAD
 - Vs 39,520 deaths from breast cancer

The Scope of the Problem

One woman dies every minute from cardiovascular disease in the U.S.!

The Scope of the Problem

- CVD accounts for a third of all female deaths
- CVD and CAD disproportionately affect African-American and Latina women

The Scope of the Problem

- Women are roughly 10 yrs older than men when they present, and have more co-morbidities
- Young women also develop CAD and have a worse prognosis than men
- Women are more likely to wait before presenting to medical attention

Stangl V, et al. Eur Heart J 2008;29:707;
Mosca L et al. Circulation 2005;111:499;
Wenger NK. Circulation 2004;109:558; Alter
DA et al. JACC 2002;39:1909

The Scope of the Problem

- Women are referred less often for appropriate testing or treatment
- Women with MI are more likely to have complications and increased mortality
- Fewer women have been included in studies, so there's less data

Awareness is lacking!

AHA Special Report

Fifteen-Year Trends in Awareness of Heart Disease in Women Results of a 2012 American Heart Association National Survey

WRITING COMMITTEE

Lori Mosca, MD, MPH, PhD, Chair; Gmerice Hammond, MD; Heidi Mochari-Greenberger, PhD, MPH, RD; Amytis Towfighi, MD; Michelle A. Albert, MD, MPH; on behalf of the American Heart Association Cardiovascular Disease and Stroke in Women and Special Populations Committee of the Council on Clinical Cardiology, Council on Epidemiology and Prevention, Council on Cardiovascular Nursing, Council on High Blood Pressure Research, and Council on Nutrition, Physical Activity and Metabolism

Awareness is lacking!

- ~2500 women > 25 y.o. surveyed
- Between 1997-2012, awareness among whole study population nearly doubled: 30%→56%
- Still low in minorities:
 - Blacks: 36%
 - Hispanics: 34%

Awareness

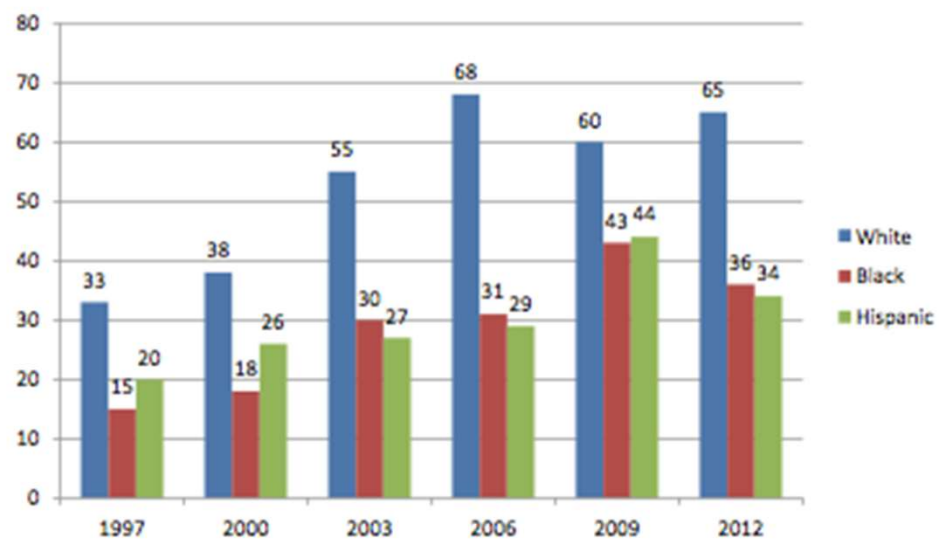


Figure. Trends in awareness that heart disease is the leading cause of death in women.

Mosca L, et al. Fifteen-year trends in awareness of heart disease in women. *Circulation* 2013; 127.

What are the symptoms?



Chest pain or discomfort



Unusual upper body discomfort



Shortness of breath



Breaking out in a cold sweat



Unusual or unexplained fatigue (tiredness)



Light-headedness or sudden dizziness



Nausea (feeling sick to the stomach)

Symptoms in women with MI

- Study of 515 women with MI
 - Chest pain absent in 43%
 - Most common symptom:
 - Dyspnea in 58%
 - Weakness in 55%
 - Fatigue in 43%
 - Prodrome:
 - Fatigue in 71%
 - Sleep disturbance (48%), dyspnea (42%)

Symptoms in women with MI

- Over 1,000,000 men and women in NRMH registry, 1994-2006 (481,581 women)
 - 42% of women presented without CP (vs. 31% of men)
 - Higher in-hospital mortality in women (14.6%) than in men (10.3%)
 - Younger women without chest pain were at the highest risk

Symptoms in women with MI

- These women who presented without CP were sicker and fared worse:
 - More had DM
 - Later presentation
 - More Killip III/IV
 - More NSTEMI
 - Less timely therapies
 - Less antiplatelet meds, heparin, BB

Awareness

Table 4. (Unaided) Awareness of Warning Signs of Heart Attack in 2012 Compared With 1997

Response (Unaided)	Survey Year	
	1997	2012
What warning signs would you associate with having a heart attack?		
Chest pain	67	56*
Fatigue	8	10
Nausea	10	18*
Pain that spreads to shoulders, neck, or arm	NA	60
Shortness of breath	33	38*
Tightness of the chest	15	17

All values are weighted percentages for telephone results for comparability between the 1997 and 2012 surveys.

NA indicates response not surveyed in 1997.

*Statistical significance between survey years at $P<0.05$.

Awareness

Table 5. (Unaided) Responses to Signs of a Heart Attack in 2012 by Racial/Ethnic Group

		Racial/Ethnic Group		
Response (Unaided)	Overall, 2012	White (a)	Black (b)	Hispanic (c)
If you thought you were experiencing signs of a heart attack, what is the first thing you would do?				
Call 9-1-1	65	63	65	73
Take an aspirin	20	22 ^c	18 ^c	10
Go to the hospital	5	5	8	4
Call a family member	4	4	2	4
Call your doctor	2	1	1	5 ^a
If you thought someone else was experiencing signs of a heart attack, what is the first thing you would do?				
Call 9-1-1	81	80	78	87
Advise him/her to take an aspirin	11	13 ^{c,d}	11	6
Take him/her to the hospital	1	1	3	2
Tell him/her to call the doctor	1	—	—	2 ^a
Call his/her spouse or family member	—	...	—	...

All values are weighted percentages among telephone respondents.

Letters denote significant differences in columns for racial/ethnic and age groups at $P < 0.05$.

Dash indicates small base sample <100; ..., empty cell

Mosca L, et al. Fifteen-year trends in awareness of heart disease in women. *Circulation* 2013; 127.

Symptoms in women with MI

- Sudden cardiac death
 - Higher rates in men
 - However, a significantly higher percentage of women who have SCD had no prior symptoms! (63% vs. 44%)

Risk Factors

- Age over 55
- Dyslipidemia: high LDL and/or low HDL
- Family hx of premature CAD
 - First degree male < 55, female <65
- Diabetes
- Smoking
- Hypertension
- Peripheral arterial disease

Risk factors

- Menopause
- Obesity
- High triglycerides
- Metabolic syndrome
- Sedentary lifestyle
- Collagen vascular disease/autoimmune disease
- CKD

Risk factors

- Pregnancy-related
 - Pre-eclampsia, eclampsia
 - Gestational diabetes
 - Stillbirth
 - Miscarriages, esp. multiple
- Hx of cancer treatments (XRT)
- Depression and stress
- Hx of trauma or abuse

Which risk factors are more predictive in women?

- Low HDL is more predictive than high LDL
- Lp (a) can be more predictive in younger women
- TG can be more predictive in older women, especially if >400 mg/dL

Rich-Edwards, JW et al. NEJM 1995;
332:1758; Miller VT. Atherosclerosis 1994;
108 Suppl:S73; Orth-Gomer K. Circulation
1997;95:329

Which risk factors are more predictive in women?

- Diabetes: almost double the risk of fatal CAD
- Smoking:
 - associated with 50% of all coronary events in women
 - Risk elevated even with minimal use

Effect of smoking

- Women who smoke have a six-fold increased risk of MI (vs. 3x in men)
- Risk was higher for women smokers than men regardless of age

Reproductive

- Pregnancy-related
 - “failed stress test:
 - Pre-eclampsia – 3.8x more likely to develop DM, 11.6x more likely to develop HTN requiring rx
 - Gestational DM: up to 70% develop DM within 5 years
- Menopause

Diagnosis

- Treadmill stress testing
- Nuclear stress testing
- Stress echo
- CT calcium score
- Coronary CTA
- Cardiac catheterization with coronary angiography

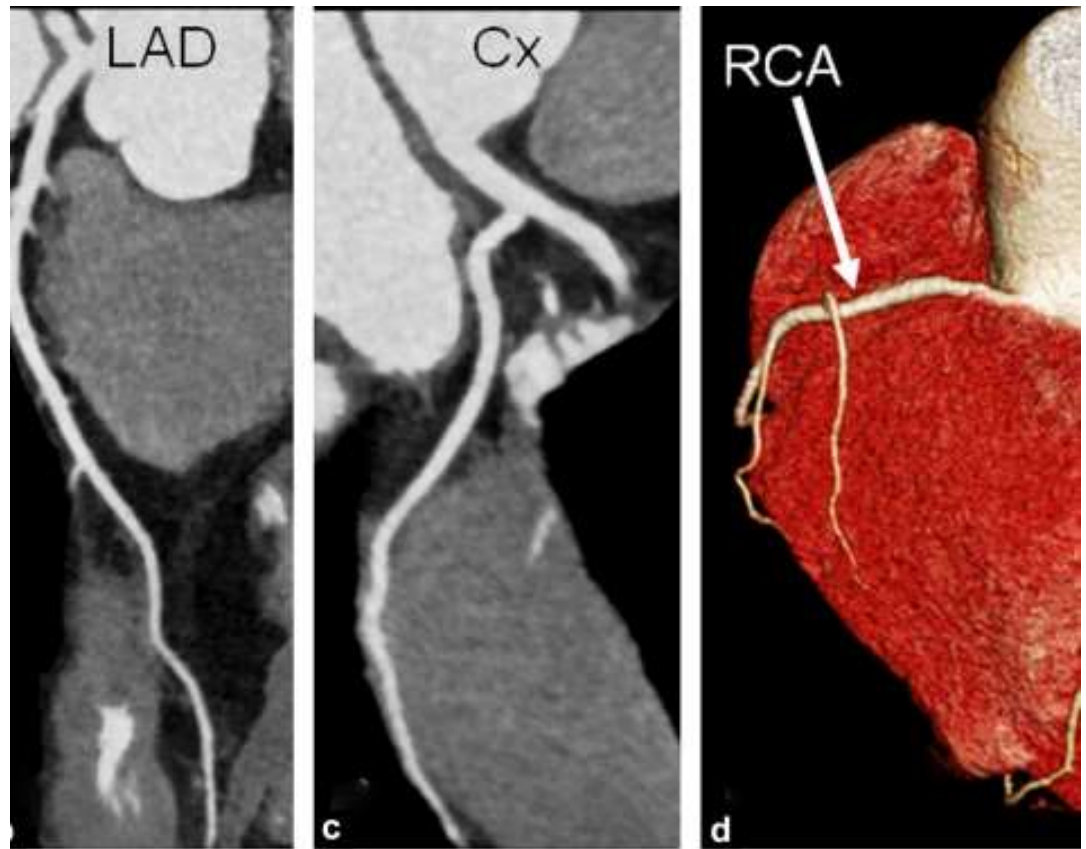
Stress Testing

- ETT only (lower than in men)
 - 61% and 70%
- Stress Nuclear (similar in men)
 - 78% and 64%
- Stress Echo (similar in men)
 - 86% and 79%

Coronary CTA

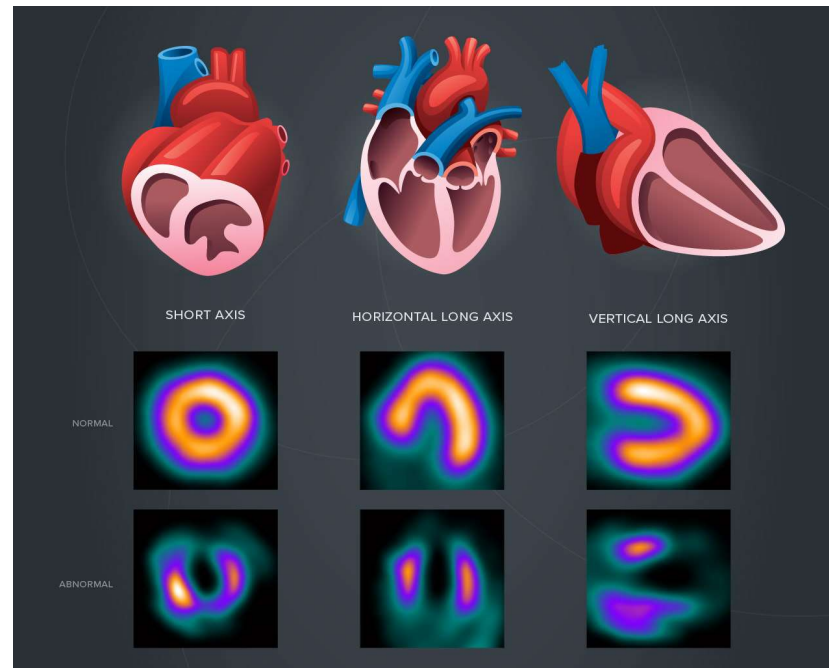
ROMICAT trial

- Women had greater reduction in LOS, lower admission rates, lower radiation doses
- More normal studies, less obstructive dz



Diagnosis

- Women less likely to be referred for further evaluation if they have a positive stress test
 - Higher incidence of MI or death in these patients



Risk Factors/Prevention

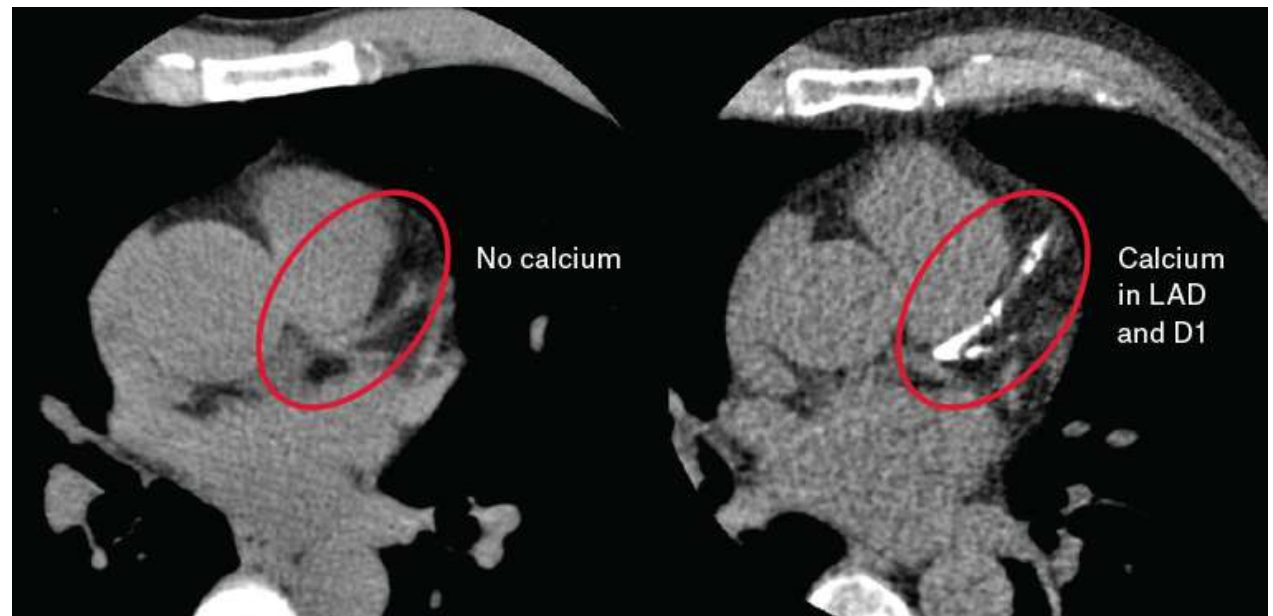
- The Multiplier Effect
 - 1 risk factor doubles your risk
 - 2 risk factors quadruple your risk
 - 3 or more risk factors can increase your risk more than tenfold
- By doing just 4 things – eating right, being physically active, not smoking, and keeping a healthy weight – you can lower your risk of heart disease by as much as 82 percent

Treatment/Prevention

- All women
 - Exercise
 - Quit smoking
 - Healthy diet
 - BMI <25, waist circumference <35 in.
 - Treat risk factors: HTN, DM, dyslipidemia
 - ASA – look at risk/benefit ratio
 - Treat depression

Treatment/Prevention

- Increasing awareness
- Screening



Mosca L et al; Circulation 2011;123:1243

Lipid therapy

- Risk calculator
 - Heavily driven by age, also includes ethnicity/race, BP, cholesterol, current tobacco use and DM
 - 65 yo M or 71 yo F with optimal RF has >7.5% 10 year risk of ASCVD
 - If uncertain, can take into consideration other factors:
 - Family hx
 - CRP>2
 - Calcium score >300 or >75%
 - Abnormal ABI (<0.9)

Lipid therapy

- Guidelines
 - Statin therapy
 - Injectable Cholesterol Lowering Medications
 - Lifestyle modifications
 - Diet high in fruits and vegetables
 - Keep sat fat <5-6%, minimize trans fat
 - Exercise: 3-4 sessions/week, 40 minutes per session to lower LDL

Treatment/Prevention

- High risk women
 - Dyslipidemia (better secondary prevention data: 4S, CARE, HPS, PROVE-IT)
 - Aspirin
 - HTN
 - No role for vitamins or HRT

Treatment in ACS or acute MI

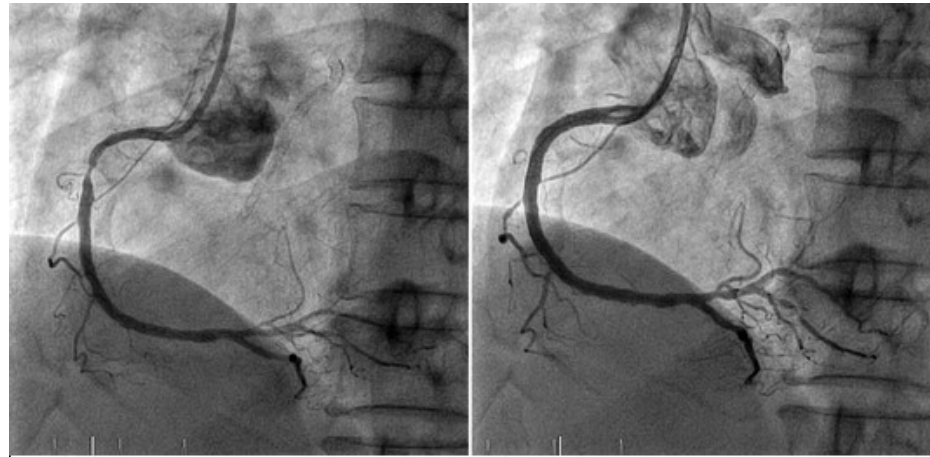
- Medical therapy
 - Aspirin, beta blockers, ACE-inhibitors
 - Statins

Interventional treatment in women

- Less likely to be referred
- Higher complication rate than in men
 - Smaller arteries, more bleeding
- But these patients do better than if no intervention
- Higher peri-procedural rate of complication but better long-term survival than men

Treatment of ACS, NSTEMI, STEMI

- Early invasive strategy for high-risk patients
- PCI for STEMI
 - Better than fibrinolysis or POBA



Glaser R et al. JAMA 2002;288:3124; Mueller C et al. JACC 2002;40:245; Lansky AJ et al. Circulation 2005;111:1611

Bleeding

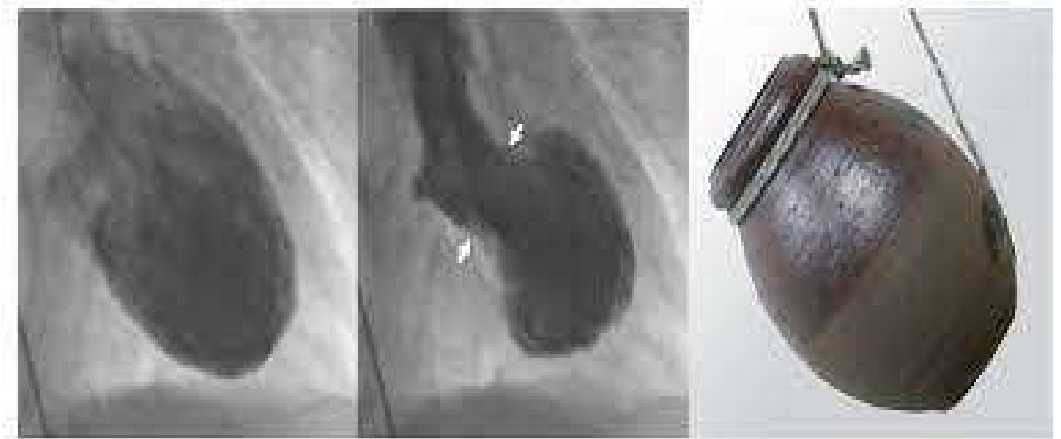
- Women have more bleeding than men
 - Technical factors, medication issues
 - RISK-PCI
 - Same efficacy as in men
 - Higher bleeding
 - Higher mortality

Bleeding

- Bleeding avoidance strategies
 - Transradial approach, closure devices, bivalirudin
 - Lower bleeding rates in both sexes
 - Higher absolute bleeding rate women with femoral approach

Other cardiac causes of chest pain

- Women's ischemic heart disease (syndrome X, microvascular disease)
- Myocarditis
 - Stress-induced cardiomyopathy
- Coronary dissection



Cancer and CV disease

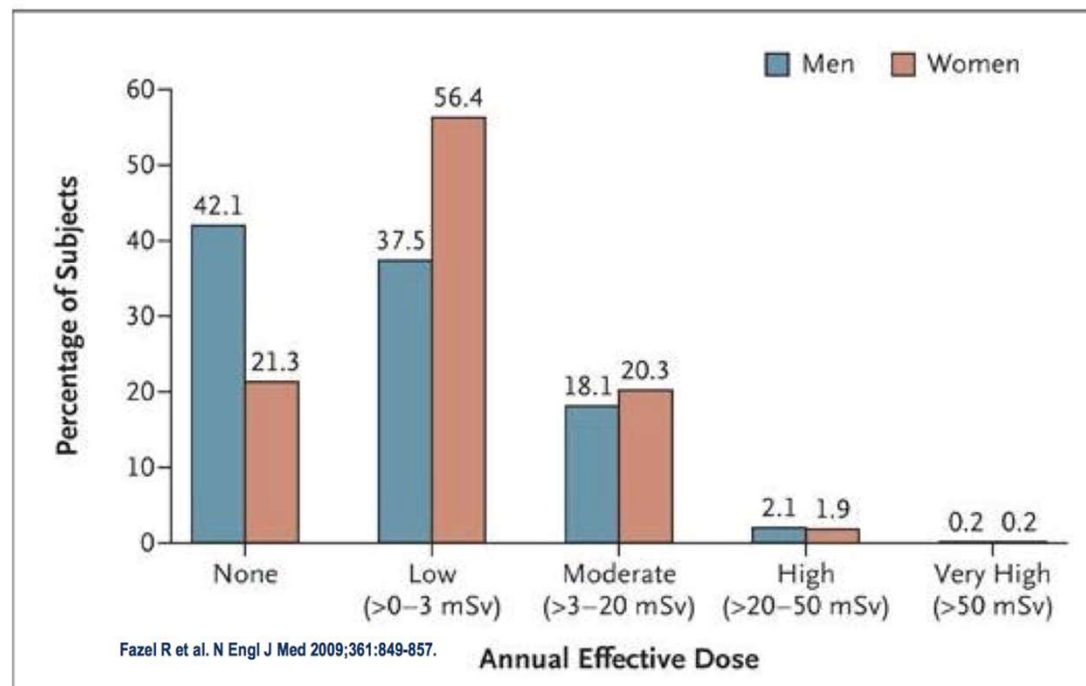
- Chemotherapy toxicity: anthracyclines and Herceptin
 - Communication and monitoring
 - Treatment of baseline risk factors: HTN, DM, CAD and LV dysfunction are patients at higher risk
 - Older patients
 - Combination chemo and higher dose chemo
 - Combination with XRT

Cancer and CV disease

- Radiation toxicity
 - Effects on all parts of the heart
 - Most common sign: pericardial effusion
 - Increases by 7.4% per gray of xrt dose
 - Starts within first 5 yrs after rx, continues for at least 20 years
 - Women with baseline cardiac RF at higher risk of events

Women and radiation exposure

Exposure to Low-Dose Ionizing Radiation from Medical Imaging Procedures



Courtesy of Ana Barac, MD, ACC HWH 2014

Take-home points

- CAD and CVD are by far the biggest health risks for women
- Awareness is still less than it needs to be
- Prevention CAN reduce risk
- Screening programs are available

Take-home points

- Women can present differently, and do worse when they do
- Women are referred less often for appropriate testing and treatment
- Women can have more complications from treatment, but still fare better than without rx
- Special considerations: pregnancy, menopause, comorbidities



THANK YOU!

