Polish Your Practice – Heart Failure

Lipid Management for the Prevention of Coronary Heart Disease in 2008

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Coronary Heart Disease

- It is the leading cause of death in adults in the United States
- It accounts for one-third of deaths in people older than age 35
- 13.7 million people in the United States have diagnosed CHD. Half have had a heart attack and about half have chest pain on exertion (angina pectoris)

Why Prevent Vs. Treat?

- The first manifestation of coronary heart disease is often a heart attack or sudden death!
- Heart attacks cause functional impairment
- Hospitalization is expensive and stressful for the patient and family members
- People with heart damage require more intensive medical care and incur higher medical costs

Risk Factors for Heart Attack

- Cigarette smoking
- High blood pressure
- Diabetes mellitus
- High blood cholesterol
- Family history of early heart disease

A Challenging Patient:1994

- 2 month history of chest pain upon exertion
- Stress test shows evidence of severely impaired blood flow to the heart
- Angiogram recommended but patient declined and wanted medical Rx
- After 3 months, patient had angiogram: severe 3 vessel CHD
- CABG recommended but patient wanted a trial on medical management

Outcome 2008

- Patient treated with medication to eliminate chest pain and to reduce risk of future heart attack
- Thyroid problems arose and were treated
- Heart rhythm problems were diagnosed and treated
- Dietary counseling and lipid medications employed
- “Bad cholesterol” (LDL) lowered from 193 to 84, triglycerides lowered from 296 to 125, and good cholesterol unchanged at 46
- No heart attack, no chest pain and no hospitalizations in the ensuing thirteen years
- Completely normal quality of life

Eating Right to Protect Your Heart

- Decrease intake of saturated fats (bacon, whole and 2% milk dairy products, cheese, ice cream, sour cream, dark meat and skin of poultry)
- In those with elevated triglycerides, reduce intake of saturated fat and simple sugars
- Increase intake of water soluble fiber (oats, barley, dried beans, peas, apples, pears, citrus)
- Increase fish consumption (minimum 8 oz./week)
- Eat more nuts, within limits (1/2 to 1 cup/day if additional calories are acceptable)
- Portion control is essential
- Avoid fast foods whenever possible

Plant Sterols and Stanols

- “Functional foods” that reduce absorption of cholesterol from small intestine
- May reduce LDL (“bad”) cholesterol levels by 6 to 20%
- Recommended daily intake 2,000 to 2,500 mg

Table 1. Plant stanol/sterol content of various foods and supplements

Food Sources	Plant Stanol/ Sterol Content	Calories/ Serving
Take Control Margarine Light	1,700 mgs/tbsp (plant sterol esters)	45
Benecol Margarine Light	850 mgs/tbsp (plant stanol esters)	50
Smart Balance Omega Plus Buttery Spread	450 mgs/tbsp (plant sterols)	80
Smart Balance Omega Plus Light Mayonnaise	100 mgs/tbsp (plant sterols)	50
Minute Maid Heartwise Orange Juice	1000 mgs/8 oz. (plant sterols)	110
Nature Valley Healthy Heart Chewy Granola Bars	400 mgs/bar (plant sterols)	160
Health Valley Heartwise Cereal	400 mgs/1 cup (plant sterols)	200
Right Direction Chocolate Chip Cookie (4 grams of soluble fiber)	1,300 mgs/cookie (plant sterols)	160
Cocoavia (snack bars)	1,500 mgs/bar (plant sterol esters)	80
Supplements		
Nature Made Cholest-Off	450 mgs/capsule (plant sterols and plant stanols)	0.1
Bee Chol in Flax Oil	800 mgs/teaspoon (plant sterol esters)	40

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Treating Lipid Disorders

- Diet, exercise and weight reduction to as close as possible to ideal body weight is the first step, regardless of medical therapy
- Be sure that your doctor has excluded medical causes of cholesterol disorders
- Dietitian consultation is of great value and should be employed, whenever possible
- Medical therapy with one or more drugs is usually necessary to achieve goals.
- Cholesterol drugs are safe if used properly

Why Eat Fish?

- Omega-3 fatty acids lower CHD risk by reducing blood clotting, improving the function of the lining of the arteries and preventing heart rhythm disturbances.
- Studies of patients at high risk of heart attacks have shown significant reduction of risk when they eat fish regularly
- Women in the Nurses’ Health Study and men in the Physicians’ Health Study showed reduction in heart attack risk in proportion to the amount of fish they ate

Fish: What You Need to Know

- Provide high protein, generally low fat option to meat
- Provides healthy fat (omega 3 fatty acids)
- Eat at least 8 ounces of fish per week
- Better to avoid fish likely to contain heavy metal contaminants (swordfish, tile fish, king mackerel and shark)
- Eat a variety of fish (this doesn’t include your favorite fast food restaurant’s filet of mayonnaise sandwich!)

Lifestyle Change to Raise HDL

- Frequency and intensity of CV exercise determines degree of rise in HDL: greater increases with five 30-minute sessions of low-intensity exercise per week than with three 60-minute sessions
- Walking has little impact on HDL
- Exercise tends to work the best in overweight people with high triglycerides and low HDL
- 1-2 drinks per day may raise HDL. ?value

Medical Treatments to Treat Cholesterol Disorders

- Drugs that reduce production of bad cholesterol in the liver
- Drugs that reduce absorption of cholesterol from the intestines
- Drugs that reduce the production and increase the breakdown of triglycerides and increase the production of good cholesterol
- Omega 3 fish oil capsules, which reduce the production and increase breakdown of triglycerides

Key Points to Remember about Cholesterol Medications

- They are extremely safe when given as directed, with proper monitoring
- They may be given as single drugs or, if needed, in combination
- If side effects occur, they are easily treated by your physician
- If side effects occur with one specific medication, other cholesterol medication may be substituted and usually gives good results

What Does Not Protect Against CHD

- Vitamin E or C or other anti-oxidants
- Cinnamon
- Guggulipid (tree resin from India)
- Policosanol (alcohol derived from sugarcane wax)
- “Flush-free niacin”
- Garlic
- Mega-dose B vitamins
- Chelation therapy
- Coenzyme Q10

What is Potentially Dangerous?

- Red rice yeast
- Slow-release niacin
- Taking someone else’s cholesterol medication because it worked for them
- Continuing on cholesterol medication without regular safety monitoring
- Being regularly followed up for your cholesterol without regular cardiac check-up
- Focusing on your heart health, but not paying attention to other important health maintenance practices (digital rectal exams, PSA, regular breast and GYN exam, mammography, bone densitometry, colonoscopy, influenza vaccination)

Current Approach to CHD Risk Assessment and Treatment

- NCEP ATP III recommends counting traditional risk factors: gender, age, TC, HDL-C, smoking, systolic blood pressure
- Framingham risk scoring is advocated for those patients with 2 or more risk factors
- Statistical modeling is used to estimate likelihood of CHD events
- Lipid management recommendations are made based upon the principle of matching treatment intensity to estimated risk level

ATP III Update 2004:

LDL-C Goals and Cutpoints for Therapy in Different Risk Categories

Risk Category	LDL-C Goal	Initiate TLC	Consider Drug Therapy
Very High risk: ACS, or CHD w/ DM,multiple CRF	<70 mg/dL	≥70 mg/dL	≥ 70 mg/dL
High risk: CHD or CHD risk equivalents (10-year risk >20%) If LDL <100 mg/dl	<100 mg/dL (optional goal: <70 mg/dL) Goal <70 mg/dl	≥100 mg/dL	≥ 100 mg/dL (<100 mg/dL: consider drug Rx)
Moderately high risk: 2+ risk factors (10-year risk 10% to 20%)	<100 mg/dL	≥130 mg/dL	≥ 130 mg/dL (100-129 mg/dL: consider drug Rx)
Moderate risk: 2+ risk factors (risk <10%)	<130 mg/dL	≥130 mg/dL	≥ 160 mg/dL
Lower risk: 0-1 risk factor	<160 mg/dL	≥160 mg/dL	≥190 mg/dL

Grundy S, et al. *Circulation* 2004;110:227

Lower LDL-C Goals for Higher-Risk Patients

AHA/ACC 2006 Guidelines
CHD, PVOD, Atherosclerotic
Aortic Disease and Carotid Disease
Goal for all patients
<100 mg/dl
Reasonable goal
<70 mg/dl

Smith SC Jr. et al. Circulation. 2006;113:2363-2372

ACC/AHA Joint Guidelines: Management of Patients with Established Atherosclerosis

- Smoking management: complete cessation
- Blood pressure mgmt: <140/90; <130/80 DM, CKD
- Lipid mgmt: goal for all pts.<100; "reasonable" LDL<70, non-HDL<100
- Physical activity: 30 minutes daily; 5 days minimum
- Weight management: BMI 18.5-24.9, WC <40"♂/35"♀
- Diabetes management: HgbA1C <7
- Antiplatelet/anticoagulant therapy: ASA 81-162mg; clopidogrel as appropriate if ASA intol. or stented
- Renin-angiotensin-aldosterone blockade as indicated
- Beta blockers post MI, ACS or LV dysfunction
- Influenza vaccination for all patients with CV disease

JACC Vol 47, No. 10, 2006. May 16, 2006, 2130-2139

Limitations of NCEP ATP III Framingham Heart Study-Based Risk Assessment

- Risk modeling is based upon a Caucasian, middle-class New England population
- FRS overestimates risk in Japanese Americans, Native Americans and Hispanics, requiring the use of re-calibration formulae, and underestimates CHD risk in many presumed "low risk" women

D'Agostino RD et al. JAMA 2001;286:180-187
Laboski SG et al. Arch Intern Med2007;167(22):2437-2442

A Different Approach to CHD Risk Assessment: Cardiac CT for Coronary Artery Calcium Scoring

- Coronary calcification occurs exclusively in coronary atherosclerosis
- No intravenous lines
- No contrast
- Test duration 5-10 minutes
- Low radiation exposure

Four Compelling Reasons to Measure CACS for CHD Risk Assessment

- It definitively diagnoses and quantifies coronary atherosclerosis
- It provides accurate prognostic information for risk of CHD death and non-fatal MI.
- It stratifies CHD risk at all levels of Framingham Risk Score
- It aids in CHD risk prediction in type 2 diabetics and in various under-represented groups such as minorities, younger patients and females.

Incremental Value of Coronary Artery Calcium Scoring Above Framingham Risk Scoring

- 1312 asymptomatic subjects >age 45 with at least one CHD risk factor and estimated 8 year CHD risk of >10% underwent cardiac CT for CACS and were followed for a median of 7 years
- Study showed that for FRS 10-15%, 16-20% or ≥ 21%, CACS>300 approximately doubles risk of CHD death or non-fatal MI as compared to CACS≤300

Greenland P et al . JAMA 2004;291:210-215

CACS Defines CHD Risk Better than Framingham Risk Scoring in Presumed Low-Risk Women

- Multi-Ethnic Study of Atherosclerosis studied 3601 asymptomatic, ethnically diverse women, aged 45-84, for 3.75 years. 90% were classified as low risk according to FRS
- Prevalence of any coronary calcium was associated with a six-fold increased risk of CHD, adjusted for age, ethnicity, BMI, LDL,HBP, smoking, estrogen and statin Rx
- CACS of ≥300 was associated with a 6.7% absolute risk of CHD as compared to those with CACS 0 (0.3%).
- Conclusions: The presence of coronary calcium defines a group of improperly categorized "low risk" women according to FRS criteria

Laboski SG et al. Arch Intern Med2007;167(22):2437-2442

ACCF/AHA Expert Concensus Document on CACS

- Estimated annual risk of CHD death or MI in intermediate risk populations according to CACS:
  - CACS 0-99: 0.4%
  - CACS 100-399: 1.3%
  - CACS ≥400: 2.4% (CHD risk equivalent)

Greenland et al. JACC Vol 49, No. 3, 2007. Jan. 23, 2007: 378-402

Implementation of a Coronary Artery Calcium Scoring-Based CHD Detection and Treatment Program at a Major University Medical Center

EDUCATE

- **E**arly
- **D**etection
- **U**sing
- **Ca**lcium Scoring for
- **T**reatment and
- **E**limination of Coronary Artery Disease

EDUCATE

Candidates for Screening

- Men, ages 45-74 and women, ages 55-74 with one or more of these risk factors
  - Cigarette smoking
  - Arterial hypertension or taking BP medication
  - HDL-C <40 mg/dl
  - Type 2 diabetes mellitus
  - Family history of CHD in first degree male relatives <age 55 or first degree female relatives < age 65
- Consider screening men and women at younger age when first degree relatives have premature CHD

EDUCATE

CACS	LDL-C Goal	Non-HDL-C Goal	Rx	Other	Follow-up
0 Low Risk <0.4%/yr	<130 (50th %-ile for Framingham population)	<160	TLC; for↑↑ LDL-C &/or ↑↑ non-HDL-C: drug Rx after 6-12 mo.	Emphasize TLC	Repeat CACS 5-10 yr
1-99 Low to Moderate Risk 0.4%/yr	<130 Optional: <100 (20th %-ile)	<160 Optional: <130	TLC; Usually low to moderate dose statin; ASA ♂	Optional ASA ♀, Omega 3	Repeat CACS 5 yrs
100-399 Moderate Risk 1.3%/yr	<100 Optional: <70 (5th %-ile)	<130 Optional: <100	TLC; Mod. to hi dose statin, often +2nd drug; ASA	Omega 3	Repeat CACS 3 years
≥400 High Risk 2.4%/yr	<70	<100	TLC; Mod. to hi dose statin, usually +2nd drug; ASA; Omega 3	Ischemia testing	No further CACS. Lipid Clinic and High-Risk CHD Registry

Clinical Utility of CACS: Case 1

- R.T. is a 57 year old ♂ referred for evaluation of CHD risk status.
- No angina, dyspnea, calf claudication or history of TIA or CVA
- CAD risk factors: Smoked up to 2.5 PPD for 18 years and none for 10 years. No DM, HBP, hypercholesterolemia or family history of premature CHD.
- PE: Wt 183. BMI 26. BP 128/78. Rest of P.E. nl.
- EKG: Sinus bradycardia at 57/min. Otherwise nl.
- Lipids: TC 155, HDL-C 35, Tg 95, LDL 101

NCEP/Framingham risk scores: Estimate of 10-yr Hard CHD risk in men without CHD

- Age: 57 y.o. ♂ = 8 points
- Total cholesterol 155 = 0 points
- HDL cholesterol 35 = 2 points
- Systolic BP 128 = 0 points
- Smoking status = 0 to 3 points

R.T.'s CHD Risk Assessment and Treatment Plan

- Framingham Risk Score: 10-13 points
  - 6-12% ten-year CHD risk
  - LDL-C goal less than 130 mg/dl, possibly less than 100 mg/dl
- Coronary artery calcium score: 438
  - 24% ten year CHD risk
  - LDL-C goal less than 70 mg/dl
  - Myocardial ischemia testing indicated

Lipid Management 2008

- Aggressively screen for risk factors for coronary heart disease
- Treat to lipid goals, in accordance with the risk factor status of the patient
- Use lifestyle change therapy first and proceed to drug therapy when indicated according to the NCEP ATP III guidelines
- Be on the lookout to refinements in risk prediction to help to more accurately determine which patients require more aggressive CHD risk factor management