



HYPERLIPIDEMIA - Secondary Prevention

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DEFINITIONS

- ▶ **PRIMARY PREVENTION:** *Clinical Management of hyperlipidemia where there is no CHD (Coronary Heart Disease).*
- ▶ *DIET is the cornerstone of therapy.*
- ▶ **SECONDARY PREVENTION** *Clinical Management of hyperlipidemia in patients with CHD. At this point medications most likely become necessary.*
- ▶ **WHY is secondary prevention critical?**
 - High LDL cholesterol leads to CHD
 - New CHD events occur again with established CHD



Hyperlipidemia: Elevation of plasma lipid concentrations

- ▶ The two most common lipids are **CHOLESTEROL** and **TRIGLYCERIDES**:
 - **CHOLESTEROL** is not always harmful. It also is used by the body to form cell membranes, hormones and bile acids.
 - **TRIGLYCERIDES** are used positively
 - for fat storage and as an energy source.



Nature of LIPIDS

- ▶ Lipids are “hydrophobic” (fat loving), they don’t dissolve in the blood and need carriers to transport them. These carriers are called LIPOPROTEINS.
- ▶ The terms hyperlipidemia and hyperliproteinemia mean the same thing.



LIPOPROTEINS

- ▶ LDL is a lipoprotein which contains 60-70% cholesterol.
- ▶ HDL is also a lipoprotein.
- ▶ LDL can be BAD! It carries lipids
- ▶ into the blood vessels forming fatty plaques.
- ▶ HDL is GOOD! It carries lipids away from the blood vessels.



Sequela of hyperliperproteinemia /hyperlipidemia

- ▶ Elevated Triglycerides can lead to acute pancreatitis.
- ▶ Elevated LDL can lead to atherosclerosis.
- ▶ Timely diagnosis and treatment of
- ▶ lipoprotein disease is imperative



Case Study #14 “I don’t want another heart attack.”

- ▶ 46 year old african american male
- ▶ had his first MI 3 months ago. At that time his cholesterol was 198 mg/dl.
- ▶ History and Physical
 - Mild HTN for 20 years (controlled with meds)
 - Exercise induced ANGINA for 4 years



Case 14 History & Physical

- ▶ FAMILY HISTORY
 - Father died of massive MI (age 52)
 - Mother alive (age 68): Stroke 4 years ago
- ▶ PHYSICAL EXAMINATION
 - PERTINENT NEGATIVES:
 - Affect: concerned and nervous “I DON”T
 - WANT ANOTHER HEART ATTACK.”



History and Physical

- ▶ WGT 224 lbs HGT 6 feet
- ▶ Rales in both lungs / LIPID PANEL abnormal
- ▶ PERTINENT POSTIVES:
- ▶ *Thyroid WLN on palpation. No*
- ▶ *hepatomegaly, splenomegaly*
- ▶ *Labs WNL (Liver, BS, Kidney)*



PROBLEM IDENTIFICATION: 1(a) *What signs and symptoms indicate the presence or severity of hyperlipidemia?*

- ▶ **No physical signs and symptoms on P.E.**
 - no XANTHOMAS, no abd pain, splenomegaly,
 - hepatomegaly, no thyroid enlargement.

• <i>Labs:</i>	Patient	Optimal
• HDL	32 (low)	above 35
• LDL	203 (high)	below 130
• T CHOL	260 (high)	below 200
• T.G.	125 (WNL)	below 200



What medical problems should be included in the patients problem list?

- ▶ CHD - s/p MI 3 months ago
- ▶ EXERTIONAL ANGINA (4 years)
- ▶ HTN (Mild, 20 years, treated with meds)
- ▶ OBESITY (wgt 224 ht 6')
 - IBW 178 (loose 48 lbs)
 - BMI 28 (obesity indicated greater than 27)



1 c) What risk factors for CHD are present in this patient?

- ▶ AGE: Male, 45 years and older
- ▶ Family History (hyperlipidemia is familial)
- ▶ Hypertension (synergistic)
- ▶ Obesity
- ▶ Hyperlipidemia (LDL 203, HDL 32 and T Chol 260)



1 d) Could any of the problems be caused by drug therapy

- ▶ Probably not, THYIAZIDE diuretics can elevate cholesterol. Furosemide is a loop diuretic.
- ▶ Drugs that are known to elevate cholesterol are glucocorticoids and some anticonvulsants.



Problems caused by medications

- ▶ Isorbide 20 mg QID (for Angina) present dose
- ▶ May not be dosed properly
- ▶ Should not be used more than 3 x day, need a daily nitrate free interval to prevent tolerance (Wells, Dipiro, 1998)

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1 e) What additional information is needed to satisfactorily assess this patient?

- ▶ **NUTRITION:** Has he tried any diet therapy? Was he compliant?
- ▶ **EXERCISE:** Is he on an exercise program? Is he compliant? Any exacerbation of his Angina?
- ▶ **SECONDARY CAUSES of HYPERLIPIDEMIA EVALUATED?**



1 e) Assessment (con't)

- ▶ **Worked up for hypothyroid?**
- ▶ **Diabetes Mellitus? Blood Sugar - 98.**
 - Major cardiac risk factors often cluster in the same individual, obesity causes hyperinsulinemia (...pathogenesis of
 - metabolic syndrome comprising hypertension, hyperlipidemia, and hyperinsulinemia (Lind, Lithell, 1993)
- ▶ **PSYCHO-SOCIAL ASSESSMENT**
 - Marital Status, children
 - Social Support



1 e) Assessment, cont

- Employment? Financial stress? (can he afford medications? Proper food?)
- Level of Education? Literacy Level?
- PC at home/ access to PC?
- Transportation to and from clinic visits?
- Psychological Type? Type A?



1 f) What class of hyperlipidemia is present in this person?

- ▶ **Type I** Presence of fasting chylomicrons
- ▶ **Type IIa** *EXCESS LDL (low density lipoprotein)*
- ▶ **Type IIb** Excess LDL and very low density (VLDL)
- ▶ **Type III** Excess IDL (intermediate density lipoprotein)
- ▶ **Type IV** Excess VLDL
- ▶ **Type V** Fasting chylomicrons and excess VLDL remnants



Desired outcome. What is the desired outcome for this patient?

- ▶ Differences in NCEP's strategy for primary
- ▶ vs. secondary treatment:
 - Lower LDL to 100 (pt needs 51% loss)
 - (primary goal is 130)
 - Lower T CHOL to 160 (Primary is 200)
 - Raise HDL to greater than 35 (Primary is the same)



3a) Therapeutic alternatives - Non drug therapies

- ▶ Non drug therapies are a partnership with medications in the treatment of hyperlipidemia. Medications alone will not provide a positive outcome. These personal changes are very formidable obstacles for patients to overcome!
Together we shall overcome! Strategy.
- ▶ *perseverance, repetition, positive reinforcement.*
- ▶ WEIGHT LOSS - 48 LBS
 - easier said than done



3a) Non drug therapies -

- ▶ DIET:
 - Institute STEP II Diet
 - NCEP recommends consulting a dietician at this point. Daily cholesterol below 200, less than
 - 7% of calories from saturated fatty acids.
 - Bran or psyllium seed can lower LDL
 - Diet can lower total cholesterol by about 5 -15%
 - assuming the patient follows the diet



3a) Therapeutic Alternatives - Non Drug Therapies
EXERCISE

- Has exertional angina - needs exercise stress test before starting an exercise program
- Refer to cardiac rehab if available
- If not available, needs graded exercise program
- Prescribe frequency, intensity, duration
- May be prescribed by primary provider in a mild form



3a) Therapeutic Alternatives - Non Drug Therapies

▶ **Antioxidants**

- Controversy about supplements.
- Dietitians feel if get adequate food, don't need supplements.
- Supplement advocates state that our food supply does not provide adequate nutrition.
- Providers should educate themselves about the pros and cons of antioxidants as patients



3a) Therapeutic Alternatives - Non Drug Therapies
Antioxidants

- ▶ **Get information from the media/internet/friends**
- ▶ **Suggested use**
 - Vitamin E (natural form) 100-400IU/day (Spencer • 1999)
 - Vitamin C (buffered) 500mg day
 - **EMPHASIS: This can be an ADJUVANT to**
 - 1) Lipid Lowering Medication 2) STEP II Diet
 - 3) Exercise. It is NOT a SUBSTITUTE nor
 - a PRIMARY THERAPY.



3a) Therapeutic alternatives - Non Drug Therapies

- ▶ HDL Reduction: There are no specific foods or nutrients that cause an increase in HDL levels with the exception of ethanol. "Moderate alcohol consumption is associated with lower CHD rates than abstinence."
- ▶ * **HOWEVER, this association may not be causal.**
- ▶ **Consumption of alcohol is NOT specifically recommended in this report. NCEP, 1993**



3b) What feasible pharmacotherapeutic alternatives are available?

- ▶ There are 4 choices of drugs for hyperlipidemia
- ▶ The drug of choice for lowering LDL are the HMG CoA reductase inhibitors. "STATINS"
- Effect enzyme synthesis of LDL by liver
- Well tolerated
- Can lower LDL by 30 - 40%



3b) Pharmacotherapeutic alternatives

- ▶ Major studies have shown that the "STATINS"
- ▶ are the best drug to lower LDL after an MI
 - 4S Scandanavian Simvastatin Survival Study 1994
 - 34% decrease coronary events
 - Reduce LDL by 22 -40 %
 - CARE (Cholesterol and Recurrent Events) 1996
- STATINS are expensive, require lifetime duration.
- Drug has not been tested over 10 years



4b) What drugs, dosage forms, doses, schedules and duration of therapy are best suited?

▶ **STATINS**

- Simvastatin 10 mg po. With evening meal
- start low and titrate up to 40 mg

- Pravastatin 10mg po in the evening (titrate up to 40mg)



3c) What alternatives would be useful if the initial therapy chosen is insufficient?

- ▶ Bile Acid Sequestrants would be a good addition
- ▶ they are synergistic with the statins (Katzung)

- ▶ fibric acid derivatives and niacin can increase
- ▶ the chance of causing myopathy if used with
- ▶ a statin



4b) What pharmacoeconomic consideration are applicable to this patient?

- ▶ Heart disease is a major economic consideration
- ▶ in the US. The cost includes hospital care, tests
- ▶ medications, outpatient follow up as well as
- ▶ disability, the time off work, distress, personal pain and depression

- ▶ Drugs cost less than intensive care, angioplasty, repeat angioplasty, CABG and repeat CABG etc.



5. *Clinical and laboratory parameters to evaluate therapeutic outcomes and detection of drug toxicity*

- ▶ Monitor cholesterol after 4 weeks to check for improvement and titrate meds
- ▶ LIVER TOXIC: LFT's at baseline (and q 6-12 weeks)
- ▶ MYOPATHY: Creatine kinase at baseline and q. 4 months. Report muscle pain or brown urine, do an immediate creatine kinase



6. *Information to enhance compliance*

- ▶ Refer to a dietician, include the family in the dietary education and plan. Expect setbacks.
- ▶ Encourage an exercise program.
- ▶ Refer to counseling, stress reduction, ventilation of feelings of depression, fear regarding heart disease.



6. *What information should be provided to the patient to enhance compliance?*

- ▶ Requires serious lifetime involvement and lifestyle changes.
- ▶ Make the patient a partner in care, include them in the decision making process. Teach about lab values and medications. Have them keep a log.
- ▶ Stress the importance of adherence to the program.



CONCLUSION - Low saturated fat, low cholesterol food for thought

- ▶ Should this patient have gotten more aggressive treatment earlier?
 - He already had 4 risk factors and a h/o angina. (“The presence of multiple risk factors exponentially increases heart risk” McBride, 1994)
- ▶ Is cholesterol screened early and aggressively enough? Are risk factors and their impact taken seriously?



CONCLUSION - Low saturated fat and low cholesterol food for thought

- ▶ The distinction between primary and secondary prevention can be somewhat arbitrary because atherosclerosis is a long term process. The risk status of high risk individuals is not fundamentally different on the day before their myocardial infarction than on the day after it.
- ▶ *NATIONAL CHOLESTEROL EDUCATION PANEL 1993*


