

***HYPERLIPIDEMIA***

*Nancy McNulty*

GSN0606  
USUHS

Nancy McNulty 1

---

---

---

---

---

---

---

---

***Learning Objectives***

- Determine target ranges for LDL-cholesterol in different clinical situations.
- Identify individuals with hyperlipidemia who are candidates for therapeutic interventions.
- Recommend appropriate pharmacotherapeutic regimens based on the type and severity of hyperlipidemia.
- Outline monitoring parameters to ensure achievement of the desired therapeutic outcome while minimizing adverse effects.
- Counsel patients on the dosing, administration, and adverse effects of their therapy and the need for compliance .

Nancy McNulty 2

---

---

---

---

---

---

---

---

***Definition***

- *Hyperlipidemia denotes an elevation of serum cholesterol and/or triglycerides above “normal limits”. Designation of normal lipid values is complicated by .. no serum level can be cited as the critical threshold for abnormality in a given individual. Normal limits are defined relative to plasma lipid values representative of the general population.*
- Price and Wilson, (1986) Pathophysiology, Clinical Concepts of Disease processes, 3rd edition.

Nancy McNulty 3

---

---

---

---

---

---

---

---

### *Definition cont.*

■ *In plasma, lipids are bound to proteins as a mechanism for serum transport. This bonding produces 4 classes of lipoproteins.*

- *chylomicrons (mostly triglyceride, MT)*
- *very low-density lipoproteins VLDL (MT)*
- *low-density lipoproteins LDL (cholesterol)*
- *high-density proteins HDL (cholesterol)*

Nancy McNulty

4

---

---

---

---

---

---

---

---

### *Patterns of Hyperlipoproteinemias*

- *I -presence of fasting chylomicrons*
- *Ila--excess low-density lipoprotein*
- *Ilb-excess LDL and very-low-density lipoprotein (VLDL)*
- *III-excess intermediate-density lipoprotein (IDL)*
- *IV-excess (VLDL)*
- *V-fasting chylomicrons and excess VLDL remnants*
- *Familial Hyperlipoproteinemia Homo/Heter*
  - *Merck Sharp & Dohme(1989), The hypercholesterolemia handbook. West Point, Pa 19486*

Nancy McNulty

5

---

---

---

---

---

---

---

---

### *Clinical Pearl*

■ *Lowering serum cholesterol in patients without existing CHD ("primary prevention") reduces new CHD events and CHD mortality; dietary therapy should be implemented in all patients, and drug treatment should be reserved for high-risk patients.*

- *Nat'l Chol Ed Program (NCEP) Jama 1993; 269--:3015-23.*

Nancy McNulty

6

---

---

---

---

---

---

---

---

### *Normal Mean values*

- Total Lipids 400-800 mg/dL
- Cholesterol 150-250 mg/dL
- Triglycerides 75-165 mg/dL
- HDL >\_ 35mg/dL
- LDL < 130mg/dL
- VLDL
- $LDL = \text{Total Cholesterol} - (\text{minus}) \text{HDL} - (\text{minus}) \text{triglycerides} / 5 \text{ or } 6$

Nancy McNulty

7

---

---

---

---

---

---

---

---

### *Conditions for obtaining accurate cholesterol determination :NCEP guidelines*

- Patient should be:
  - following usual diet for 2 to 3 wks before testing
  - neither attempting to lose or gain wt.
  - in usual state of health (no acute illness, not pregnant, no MI within 3 months)
  - nonfasting can be taken any time of the day, even after high-fat meal.

Nancy McNulty

8

---

---

---

---

---

---

---

---

### *Cont.,*

- Practitioner:
  - take into account patient's use of drugs known to alter lipid levels
  - perform venipuncture after patient has been sitting for at least 5 minutes
  - apply tourniquet for as brief a time as possible
  - use fasting blood sample only for lipoprotein analysis

Nancy McNulty

9

---

---

---

---

---

---

---

---

## Hyperlipidemia Primary Prevention for Men

- This case involves a man who has type IIa hyperlipidemia (isolated hypercholesterolemia) without established heart disease (CHD). The goal of therapy is prevention of the first episode of CHD (primary prevention).

Nancy McNulty

10

---

---

---

---

---

---

---

---

## Patient Presentation

- 68 yo male total cholesterol 280 mg/dl at a community screening 2 months ago F/U lipoprotein levels at practitioner's office

Lipid Fraction (mg/dL)	one month ago	this month
■ Total Cholesterol	280	299
■ Triglycerides	100	120
■ HDL	60	66
■ LDL	200	209

Nancy McNulty

11

---

---

---

---

---

---

---

---

## Factors

- HTN 9 years, no hx of CHD
- Father died at age 52 MI; Mother died at 78 ?; one sister 59 yo alive and well
- Smokes, ETOH 12 oz/month, exercises?
- Meds HCTZ 25 mg po QD since 1986
- African American
- Wt 63.5 kg, Ht 158 cm B/P 176/86 average of 3 readings
- Labs Na 137mEq/L, K 3.3 mEq/L, Cl 95mEq/L, BUN 16mg/dL, serum creat 1.4mg/dL, F.G. 145mg/dL.

Nancy McNulty

12

---

---

---

---

---

---

---

---

*Risk Factors: for CHD present?*

- MALE
- FAMILY HX
- HTN
- ^ LDL
- SMOKING
- EXERCISE MAY OR MAY NOT GET ENOUGH

Nancy McNulty

13

---

---

---

---

---

---

---

---

*What is the goal LDL cholesterol level in this situation?*

- < 130mg/dL for a person who has 2 or more risk factors.
- Look for other causes of the condition  
TSH for hypothyroidism?

Nancy McNulty

14

---

---

---

---

---

---

---

---

*What non-pharmacologic interventions should be considered?*

- Step one diet
- Smoking cessation
- Weight reduction
- Exercise routinely
- Change to another antihypertensive due to race and medication

Nancy McNulty

15

---

---

---

---

---

---

---

---

## Clinical Course

- A diet low in saturated fat, total fat, and cholesterol was prescribed. Subsequent compliance with diet was determined to be acceptable by a 3 day diary after 6 months of f/u. A lipid profile after this intervention was obtained, and the following values were reported.

Nancy McNulty

16

---

---

---

---

---

---

---

---

## Values

- Fraction (mg/dL)
- Total Cholesterol  
262
- Triglycerides  
90
- HDL Cholesterol  
52
- LDL Cholesterol  
192



Nancy McNulty

17

---

---

---

---

---

---

---

---

## Assessment of the interventions

- His LDL is still high, why?
- Has he lost weight? If he has, this might be an indication he is sticking to the diet.



Nancy McNulty

18

---

---

---

---

---

---

---

---

### *Other interventions*

- *He needs to begin education to lower his LDL. He has lost HDL which is not good this may due to the diet or not exercising .*
- *Start medications*

Nancy McNulty

19

---

---

---

---

---

---

---

---

### *Other therapeutic alternatives*

- *Drugs available for the patient are niacin, bile acid resins (BAR), HMG Co-A reductase inhibitors (statins), and fibric acid derivative.*
- *Metamucil will also help by increasing fiber and excretion of LDL.*

Nancy McNulty

20

---

---

---

---

---

---

---

---

### *Optimal plan for goal LDL*

- *Give a statin once daily with the evening meal or at bedtime. Lovastatin 20 mg. A BAR,cholestyramine 4g or colestipol 5g once daily . Doses will be increase gradually based the lipid levels at approximately 4 week intervals*

Nancy McNulty

21

---

---

---

---

---

---

---

---

*Assessment parameters: monitoring for efficacy and adverse effects.*

- For the first 3-6 months a lipoprotein profile should be drawn and analyzed, after that total cholesterols may be assessed.
- Next check B/P, smoking status, indications that he may have CHD< CVA, and PVD
- Adverse effects of medication LFTs, s & sx of hepatitis, ^CPK muscle aches/soreness, weakness: GI

Nancy McNulty

22

---

---

---

---

---

---

---

---

*Patient Counseling*

- Cholestyramine powder: Never take this medication in its dry form, always mix it in a liquid, water, soup, applesauce, etc, stir it to a uniform consistency. It tastes better if you refrigerate it after mixing.
- If you miss a dose, take it as soon as you remember, if it is almost time for your next dose skip the missed dose.

Nancy McNulty

23

---

---

---

---

---

---

---

---

*Counseling cont.*

- Statins: Take this medication once daily with your evening meal or at bedtime.
- If you miss a dose, take it as soon as possible, if it's almost time for another dose, skip the missed dose.
- report any unexplained muscle pain, tenderness or weakness
- Follow your diet
- Keep all F/U appointments w/ practitioner

Nancy McNulty

24

---

---

---

---

---

---

---

---

**HYPERLIPIDEMIA**  
*(PRIMARY PREVENTION IN  
POSTMENOPAUSAL  
WOMEN)*

Nancy McNulty 25

---

---

---

---

---

---

---

---

**LEARNING OBJECTIVES**

- Determine goal LDL & HDL cholesterol concentrations in patients treated for primary prevention hyperlipidemia
- Recommend appropriate pharmacotherapy for hyperlipidemia in postmenopausal women
- Identify monitoring parameters for patients receiving pharmacotherapy for hyperlipidemia
- Counsel patients about their drug therapy, including recommendations for patients experiencing adverse effects.

Nancy McNulty 26

---

---

---

---

---

---

---

---

**Patient Presentation**

- CC: "My cholesterol was 248 at a health fair last week." New labs TC 245mg/dL, Triglycerides 175mg/dL, HDL 40mg/dL, LDL 170mg/dL
- This case presents issues related to primary prevention of coronary heart disease in postmenopausal women.

Nancy McNulty 27

---

---

---

---

---

---

---

---

*HPI cont.*

- A 54 yo women with asthma, hypertension, hx of smoking and ^LDL cholesterol presents for f/u eval and possible treatment of hyperlipidemia. In her case, dietary modification and HRT may be sufficient to lower LDL cholesterol to the target range(<130mg/dL). A careful medication hx should always be obtained in hyperlipidemic patients, as a number of medications may adversely affect lipid concentrations

---

---

---

---

---

---

---

---

*Problem identification: What signs and symptoms or lab values indicate the presence or severity of hyperlipidemia in this individual*

- Hyperlipidemia is an asymptomatic disease in the vast majority of patients dx'd as hyperlipidemic. The lab tests show elevated LDL.

---

---

---

---

---

---

---

---

*What medical problems or issues should be included on this patient's problem list?*

- Hyperlipidemia
- Hypertension
- Mild Asthma
- Postmenopausal State



---

---

---

---

---

---

---

---

*What risk factors for CHD are present in this patient?*

- $\uparrow$ LDL
- Hypertension
- Smoking
- Postmenopausal
- Exercise?



Nancy McNulty

31

---

---

---

---

---

---

---

---

*Could any of this patient's problems be caused by drug therapy?*

- Beta agonists alter lipid profiles, generally reducing HDL by 10% and  $\uparrow$  triglycerides by 40%. Some evidences suggests that beta-receptor antagonists with intrinsic sympathomimetic activity have lesser effect.

Nancy McNulty

32

---

---

---

---

---

---

---

---

*What additional information is needed to assess this patient?*

- Evaluation of diet
- Exercise level
- Siblings? Do they have CHD?



Nancy McNulty

33

---

---

---

---

---

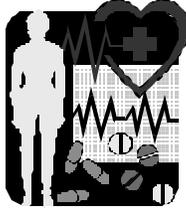
---

---

---

*What class of hyperlipidemia is present in this person?*

- *This person is classified as type IIa hyperlipoproteinemia, where only the LDL is elevated.*



Nancy McNulty

34

---

---

---

---

---

---

---

---

*What is the desired therapeutic outcome for this patient?*

- *The overall goal is to reduce CHD events and CHD associated mortality by maintaining LDL within a predetermined target range and reducing or eliminating other CHD risk factors. Since this patient has at least 2 risk factors for CHD, the LDL should be lowered to less than 130mg/dL.*

Nancy McNulty

35

---

---

---

---

---

---

---

---

*What non-drug therapies might be useful in the initial management of this individual?*

- *Dietary education should be provided to all patients with hyperlipidemia. Dietary modification may reduce LDL by 5-15% depending upon the patient's compliance.*
- *Smoking cessation and*
- *Exercise*



Nancy McNulty

36

---

---

---

---

---

---

---

---

*What feasible pharmacotherapeutic alternatives are available?*

- *HRT is the treatment of choice in postmenopausal women without CHD, who have no contraindications to hormone therapy. ERT is known to reduce LDL by 15% and increase HDL by 15%. Try HRT and diet before other drug therapies.*

Nancy McNulty 37

---

---

---

---

---

---

---

---

*Optimal Plan: What drugs, dosage forms, doses, schedules, & duration of therapy are best suited for this patient's management?*

- *HRT and diet should help her achieve the 25% reduction in LDL*
- *.625 estrogen and 2.5mg of medroxyprogesterone po QD. If she has a uterus, this will prevent menstrual cycles. If she has had a hysterectomy then only estrogen.*

Nancy McNulty 38

---

---

---

---

---

---

---

---

*What drugs should be considered if the goal LDL is not reached with initial therapy?*

- *One of the statins or BARs*
  - *Durrington, P.N., (1998). Atherosclerosis*
- *Should any changes be made in her med profile?*
  - *Change the beta receptor antagonist to an ACE inhibitor*
  - *What psychosocial issues are applicable to this patient?*
  - *Breast Cancer and endometrial cancer with HRT therapy*

Nancy McNulty 39

---

---

---

---

---

---

---

---

*What parameters should be used to assess the outcome of therapy?*

- *LDL, HDL, & triglycerides should be evaluated 3 months after initiation of dietary therapy and HRT and then annually thereafter. Close observation of her B/P is required to ensure that satisfactory control is maintained.*

Nancy McNulty 40

---

---

---

---

---

---

---

---

---

---

*Patient Counseling: What information should be provided to the patient to enhance her compliance?*

- *LDL is the "bad" cholesterol. If the level stays high for many years, it increases your chances of having heart disease, chest pain, or heart attacks. Your LDL cholesterol level was high at 170; your goal level is 130, so you need to reduce it by about 25%. If you stick to your diet and take the estrogen and the progesterone you may be able to reach this goal without taking other medicines.*
- *Because dietary therapy is so important. I recommend that you see a dietitian for a complete dietary consultation.*
- *The estrogen therapy may cause some menstrual spotting for the 1st month or 2; this usually stops.*
- *Estrogen may cause some nausea and breast tenderness.*
- *You will probably continue to take the estrogen therapy indefinitely.*
- *estrogen may help to prevent osteoporosis and reduce hear disease and deaths due to heart disease.*

Nancy McNulty 41

---

---

---

---

---

---

---

---

---

---

**REFERENCES**

- *Ames, R., (1998). Hyperlipidemia of diuretic therapy. Archives des Maladies du Coeur et des Vaisseaux. 91 Suppl:23-7, Sep.*
- *Merck Sharp & Dohme, (1989). The hypercholesterolemia handbook. Division of Merck & Co., West Point, PA 19486.*
- *Paoletti, R., Bellosta, S., (1999). Best practice--ongoing polemics. Atherosclerosis. 143 Suppl 1:S3-6, May.*
- *Price, S.A., Wilson, L.M., (1986). Pathophysiology, clinical concepts of disease processes third edition. New York: McGraw-Hill Book Company.*
- *Sacks, F.M., Ridker, P.M., (1999). Lipid lowering and beyond: results from the CARE study on lipoproteins and inflammation. Cholesterol and Recurrent Events. Herz. 24(1):51-6, Feb.*
- *Skilling, J., (1998). Practical management of lipid disorders. Lippincotts Primary Care Practice. 2 (5):472-84, Sep-Oct.*

Nancy McNulty 42

---

---

---

---

---

---

---

---

---

---

*References*

Nancy McNulty 43

---

---

---

---

---

---

---

---