Experiential Learning Experience Activity – Hyperlipidemia

This document is a suggested learning activity for pharmacy learners
(APPE, PGY1, PGY2 residents) to complete during their ambulatory care rotation block.
Consider using as a pre-test/post-test or as a topic discussion with preceptor.

Optional Recommended Reading:

- 2018 AHA/ACC/AACVPR/AAPA/ABC/ACPM/ADA/AGS/APhA/ASPC/NLA/PCNA Guidelines on Management of Blood Cholesterol: https://www.ahajournals.org/doi/10.1161/cir.0000000000000625
- Dureden M et al. Cardiovascular risk assessment and lipid modification: NICE guidelines. 2015: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4484941/
- Wilkins J, Lloyd-Jones DM. Novel lipid-lowering therapies to reduce cardiovascular risk. JAMA. 2021;326(3):266-67. https://jamanetwork.com/journals/jama/fullarticle/2782198?utm_source=podcast_platforms&utm_medium=referral&utm_campaign=related_article_links

Overview:

1. Explain the pathophysiology of hyperlipidemia related to increased cardiovascular risk.

2. Define the four benefit categories specified in the 2018 AHA/ACC Cholesterol guidelines. What is the goal LDL lowering for each?

Benefit Category Population	LDL Goal

3. Non-statin therapy:
   a. What other drug classes are included in the guidelines?
   b. When do you use them?
   c. Do any have cardiovascular benefit – if so, which ones?

4. Please complete the following graph in terms of percentage increase, decrease or no change for each medication/medication class.

	LDL	HDL	Triglycerides
Statins			
Ezetimibe			
Niacin			
Fenofibrate			
Lovaza©			
Bempedoic acid			
Vascepa©			
Inclisiran			

5. Please list the available high intensity statins (names/strengths).

6. One of the most common side effects/concerns with statin therapy is myopathy. If myalgias occur with statin use name three strategies to minimize this side effect yet keep the patient on statin therapy. Be specific.

7. What statin(s) are preferred in renal dysfunction?

8. When does a statin need to be discontinued based on liver function/CK values? Can a statin be tried again in each circumstance?

9. What is the relationship between vitamin D levels and statin intolerance?
   a. How do we correct Vitamin D levels (i.e. dosing)?

10. What herbal supplement is available that has a statin as a primary ingredient?

11. Please discuss the drug-drug interaction with gemfibrozil and statin therapy. What would you do if a patient was prescribed simvastatin and gemfibrozil (statin is indicated AND prior history of TG >500)?

12. PCSK9 inhibitors and Incliseran:
   a. Explain the mechanism of action of both:
   b. How are the medications administered; please counsel a patient on their use:

13. What is the literature for the following agents and potential mortality benefits?
   a. Repatha
   b. Incliseran
   c. Vascepa

14. For patients who need further triglyceride lowering after the addition of a statin, which medication would be preferred and why?

Test Prep Questions:

15. A 76yo man with PMH of HTN x 15 yrs, ventricular tachycardia x 5 yrs, and ischemic heart disease with MI 3 years ago has the following FLP: LDL 110, HDL 28, and TRG 80. Current meds are ASA 81mg/d, Plavix 75mg/d, amiodarone 400mg/d, carvedilol 25mg BID, lisinopril 40mg/d and simvastatin 20mg/d. Which of the following changes should be made to help this patient reach his LDL goal?
    a. Increase simvastatin to 40mg/d
    b. Increase simvastatin to 80mg/d
    c. Change simvastatin to atorvastatin 80mg/d
    d. He is at goal and does not need any changes

16. At what point are fibric acids indicated for hypertriglyceridemia?
    a. 150 mg/dl
    b. 250 mg/dl
    c. 350 mg/dl
    d. 450 mg/dl
    e. 500 mg/dl

17. JM is a 64-year-old woman with a PMH of pancreatitis (when TG 2200 mg/dL), uncontrolled gout, severe psoriasis, recurrent infections requiring hospitalization, and lovastatin-associated myopathy. Her current medications include rosuvastatin, prednisone, and allopurinol. Colchicine was also added a few days ago for a gout exacerbation. She reports an anaphylactic reaction after eating seafood in college. Her LDL-C is 96 mg/dL, HDL-C 42 mg/dL, and TG 640 mg/dL. Which of the following is the safest addition to her therapy?
    a. Niacin
    b. Colesevelam
    c. Fish oil
    d. Fenofibrate

18. Which patient would qualify for a high intensity statin?
    a. An 72 yo male being discharged from the ED due to stroke
    b. A 53 yo female with diabetes, LDL of 165 and ASCVD risk score of 6.3%
    c. A 45 yo with a ASCVD risk score of 6.8%
    d. A 58 yo with an LDL of 170

19. Which of these statins has the lowest risk for myopathy/myalgia and why?
    a. Lipitor; high protein binding
    b. Zocor; CYP3A4 substrate
    c. Livalo; rapid absorption
    d. Crestor; high hydrophilicity

20. A 65-year-old male with a past medical history significant for hypertension, peripheral artery disease and type 2 diabetes is being seen for a follow-up visit today at his PCP's office. One month ago, he was diagnosed with hyperlipidemia was prescribed atorvastatin 40mg to lower his lipid levels as well as for cardiovascular protection. He

reports tolerating the medication well with no adverse effects. At his appointment today, his most recent lab work is as follows:

LDL: 70 mg/dL
HDL: 45 mg/dL
Triglycerides: 502 mg/dL

Which medication is appropriate to initiate today?

a) Ezetimibe
b) Colesevelam
c) Vascepa
d) Fenofibrate

Patient Cases:

e) A 56 year old white male comes to your office. Vitals show BP 140/94, P 80, RR 18 and labs show BMP WNL but FLP shows TC 240, LDL 150, HDL 20 and TG 150. In addition, you smell cigarette smoke on him, which you ask about. He replies that you are correct and he should really stop since both his parents died of MIs in their 50's.
   a) Which group does he belong and what is your plan?
   b) What is your goal? When would you recheck to see if you attain this goal?

f) An 61 yom with PMH significant for HTN, depression, CAD with unstable angina, HFrEF, OSA, and GERD presents for an annual appointment and follow up. Current medications include: aspirin 81 mg daily, carvedilol 6.25 mg BID, NTG 0.3 mg SL PRN, omeprazole 20 mg BID, sertraline 50 mg daily.

Calcium				9.2			9.0
Ionized Calcium							1.21
Normalized CAlcium							1.25
Magnesium				1.6			
Phosphorus							2.6
Albumin				3.2			
Bilirubin, Total				1.0			
Alkaline Phosphatase				93			
ALT				17			
AST				24			
Anion Gap				15			10
NT Pro BNP				3,911			
eGFR-African American				>60			>60
eGFR-All Other Races				>60 *			>60 *
eGFR							
Vitamin B12	467						
Folate							
Ferritin							337.9
Iron							
TIBC							
Transferrin Satura...							
CRP							19.1
Cholesterol, Total	269 *						
Triglyceride	239 *						
Fasting Time	12						
HDL Cholesterol	35 *						
LDL Cholesterol	186 *						
VLDL Cholesterol	48						
TC:HDL Ratio	7.69						
LDL:HDL Ratio	5.31 *						
Non HDL Cholesterol	234 *						
Vitamin D 25 Hydroxy	23.8 *						

a. What is this patient's goal LDL?
b. What would you recommend for this patient's HLD care? Be specific on dose, regimen.
c. Please provide key counseling points.

Over a period of 6 months, you increase the medication you initiated to maximum dose. The patient is tolerating well without issues. Resulting cholesterol panel collected today is: total cholesterol 135, LDL 84, TG 121

a) What changes, if any, would you make at this time?

g) A 47 yoAAf presents for follow up to your family medicine clinic for diabetes. Other PMH include: HTN, asthma, back pain, and depression. Current medications include: albuterol – 1 puff Q6H PRN, symbicort 2 puffs BID, cetirizine 10 mg daily, metformin 1,000 mg BID, escitalopram 20 mg daily, and losartan 100 mg daily. Patient is a non-smoker. Last BP – 124/57, weight 201 lbs, height 5'4". BMP WNL, HbA1c today 6.7%; total cholesterol 155, TG 112, HDL 48, LDL 85. What is this patient's indication for statin therapy? Please describe the plan for this patient's HLD.