

Drugs for hyperlipidemia

- **SUMMARY.** (Slide 2)
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Target	Class	Drug	Action	ADRs	Effect (%change)	Notes
Exogenous Cholesterol	Bile Acid sequestrants	Cholestyramine Colestipol Colesevelam	Form an insoluble complex with the bile acids and salts, preventing their reabsorption from the intestine and disrupting the enterohepatic circulation of bile acids.	GI distress, constipation , decreased absorption of other drugs (Statins, Ezetimibe Chlothiazides, Digoxin, Warfarin) Colesevelam does not interfere with absorption of other drugs	↓ LDL ↑ HDL No change in triglycerides	<u>Contraindications:</u> 1- Complete biliary obstruction 2- Chronic constipation 3-Severe hypertriglyceridemia (TG >400 mg/dL)
	Cholesterol absorption inhibitor	Ezetimibe	Ezetimibe reduces C absorption. Therefore, ezetimibe reduces the flux of C from the intestine to the liver.	<i>Not common</i> GIT disturbance, headache, fatigue, arthralgia & myalgia	↓ LDL(14-18), ↑ HDL (1-3) ↓Triglyceride (2)	<u>Monotherapy:</u> primary prevention of low risk CHD. <u>Combination therapy: safe:</u> with statins or fibrates
endogenous cholesterol	Statins (HMG-Co A Reductase Inhibitors)	Simvastatin Lovastatin Atorvastatin Pravastatin Rosuvastatin	potent competitive inhibitors of HMG-CoA reductase	Common: Headache , myalgia, fatigue, GI intolerance, and flu-like symptoms Hepatotoxicity, Teratogenicity. Muscle aches, or weakness associated with an elevation of creatine kinase (CK) released from muscles, are the best indicator of statin-induced myopathy	↓LDL 18-55% ↑ HDL 5-10% ↓TG & VLDL 10-30%	It is important to check CK & liver enzymes regularly upon administration of statins.
	Niacin (Nicotinic Acid)		In adipose tissue: it binds to adipose nicotinic acid receptors In liver:inhibits hepatocyte diacylglycerol acyltransferase-2 In plasma : it increase LPL activity	Flushing (+aspirin) Hyperglycemia, Hyperuricemia, GI distress, hepatotoxicity	↓LDL (15-30), ↑HDL (15-35) ↓ Triglyceride (20-50)	Contra-indications Gout – Peptic ulcer – Hepatotoxicity – Diabetes mellitus
	Fibrates	Clofibrate Fenofibrate Gemfibrozil	They increase gene transcription for lipoprotein lipase (LPL) leading to increased catabolism of TG in VLDL and chylomicrons	Dyspepsia, gallstones , myopathy	↓LDL (5-20), ↑HDL (10-20) ↓Triglyceride (20-50)	Pregnant or nursing women ,Renal impairment,Gall-bladder disease.In alcoholics

Q1: Which one of the following drugs binds bile acids in the intestine, thus preventing their return to the liver via the enterohepatic circulation?

- A) Niacin. B) Fenofibrate. C) Cholestyramine. D) Fluvastatin.

Q2: A 62-year-old female with hyperlipidemia and hypothyroidism. Her current medications include cholestyramine and levothyroxine (thyroid hormone). What advice would you give to her to avoid a drug interaction between her cholestyramine and levothyroxine?

- A) Stop taking the levothyroxine as it can interact with cholestyramine.
B) Take levothyroxine 1 hour before cholestyramine on an empty stomach.
C) Switch cholestyramine to colestipol as this will eliminate the interaction.
D) Take levothyroxine and cholestyramine at the same time to minimize the interaction.

Q3: Which of the following patient populations is more likely to experience myalgia (muscle pain) or myopathy with use of HMG CoA reductase inhibitors?

- A) Patients with diabetes mellitus. B) Patients with renal insufficiency. C) Patients with gout. D) Patients with hypertriglyceridemia.

Q4: Which one of the following drugs decreases cholesterol synthesis by inhibiting the enzyme 3-hydroxy-3- methylglutaryl coenzyme A reductase?

- A) Fenofibrate. B) Niacin. C) Cholestyramine. D) Lovastatin.

Q5: A 42-year-old man who was started on niacin sustained-release tablets 2 weeks ago for elevated triglycerides and low HDL levels. He is complaining of an uncomfortable flushing and itchy feeling that he thinks is related to the niacin. Which of the following options can help him manage this adverse effect of niacin therapy?

- A) Administer aspirin 30 minutes prior to taking niacin. B) Administer aspirin 30 minutes after taking niacin.
C) Increase the dose of niacin to 1000 mg. D) Change the sustained-release niacin to immediate-release niacin.

Q6: A 72-year-old female who is treated for hyperlipidemia with Pravastatin for the past 6 months.. Her physician wishes to add an additional agent to block absorption of exogenous cholesterol. Which of the following choices is the best option?

- A) Niacin. B) Colesevelam. C) Gemfibrozil. D) Ezetimibe.

Cont... MCQs

Q7: Patient comes into the ER with gallstones, after further investigations You find out that he is on drugs to treat his hyperlipidemia. Which of the following drugs could have caused his gall stones?

- A) Niacin. B) Fenofibrate C) Ezetimibe D) Colesevelam

Q8: A 65-year-old man who presents to his physician for management of hyperlipidemia. His most recent lipid panel reveals an LDL cholesterol level of 136 mg/ dL and very low HDL cholesterol about 28 mg/ dL. His physician wishes to begin treatment to increase his HDL cholesterol levels.

Which of the following therapies is the best option to increase HDL cholesterol levels?

- A) Colesevelam. B) Niacin. C) Simvastatin. D) Ezetimibe.

Q9: Patient with diabetes has hyperlipidemia, Which drug of the following can not be used in his case due the risk of development of Hyperglycemia?

- A) Niacin. B) Statins . C) Colestipol. D) Ezetimibe.

Q10: Patient with hypercholesterolemia taking a combination of two anti hyperlipidemic drugs, After 4 days the patient complaining of sever myalgia and increase in creatine kinase. Which drugs did this patient use?

- A) Cholestyramine & Lovastatin. B) Fenofibrate & Ezetimibe. C) Lovastatin & Fenofibrate. D) niacin & Ezetimibe.

Q11: Patient went to the hospital to check his blood cholesterol level and he had an increase in LDL, The doctor prescribes one of the an4 hyperlipidemia drugs with vitamins D and E supplement, What is the most likely drug the doctor prescribed?

- A) Statins. B) Colestipol. C) Ezetimibe. D) Nicotinic acid

Q12: A 72-year-old male who is treated for hyperlipidemia with anti-hyperlipidemic agent for the past 6 months. He also has a history of sever constipation. His most recent lipid panel shows an LDL cholesterol level of 131 mg/dL, and high level of triglycerides of 510 mg/dL, and there is no change in HDL cholesterol.

Which of the following drugs did this patient use?

- A) Ezetimibe. B) Niacin. C) Colestipol. D) Gemfibrozil.

Q13: Which one of the following is the most common side effect of anti-hyperlipidemic drug therapy?

- A) Elevated blood pressure. B. Gastrointestinal disturbance. C. Neurologic problems. D. Heart palpitations.

Answers
7:B
8:B
9:A
10:C
11:B
12:C
13:B

SAQ

A 72-year-old male who is treated for hyperlipidemia with high-dose atorvastatin for the past 6 months. He also has a history of renal insufficiency. His most recent lipid panel shows an LDL cholesterol level of 131 mg/dL, triglycerides of 510 mg/dL, and HDL cholesterol of 30 mg/dL.

Q1: What is the mechanism of action of Atorvastatin ?

It is an example of Statins which are potent competitive inhibitors of (HMG-CoA) reductase which is an important enzyme in cholesterol synthesis in the liver.

Q2: Is there anything special about Atorvastatin?

Yes, it has long half-life (14 hours) so we can take it at any time of the night.

Q3: What are the most serious side effect of statin group, that we have to be aware of them by frequent lab investigation ?

Hepatotoxicity, Myopathy

Q4: If his physician wishes to add an additional agent for his hyperlipidemia. Which of choices is the best option in his case ? why ?

Niacin (nicotinic acid), because it is the most effective medication for increasing HDL cholesterol levels and it has positive effects on the complete lipid profile. So it is useful for patients with mixed dyslipidemias.

Q5: list three of contraindication for this drug ^^?

1-Gout. 2-Peptic ulcer. 3-Diabetes mellitus.

Q6: why we can not use any drug from Resins group in this case ?

Because he has high level of TG and The bile acid binding resins can raise triglycerides more and more which will worsen his situation.

Q7: why we can not use any drug from Fibrate group in this case ?

He has a history of renal insufficiency so we can not combine the fibrate with statin because the incidence of myopathy may increase, he also may develop Rhabdomyolysis.



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