Effects of Statins Lipid Lowering Drugs on Lipid Profile

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Abstract:

Background: Hyperlipidemia has become one of the most common problems in day-to-day’s life. Lipid-lowering drugs, especially 3-hydroxy-3-methylglutaryl Coenzyme A reductase inhibitors, are widely used in the treatment and prevention of cardiovascular disease. Blood cholesterol levels are a strong predictor of mortality and morbidity associated with CVD.

Patients and methods: Serum samples were collected from thirty patients (age range was 45-70 years old), taking antilipid drugs. Then lipid profile (Total cholesterol, HDL, LDL, vLDL) were detected by specific kits.

results: Results showed the presence of normal HDL and LDL in the patients taking lipid lowering drugs in compare with the control group. While TGs and vLDL levels were still high in these patients in compare with the control group.

Discussion: The results reflect partial effectiveness of statins and it may need a combination with other lipid lowering drug like ezetimibe and nicotinic acid which form effective combination

Conclusion: Statins affected (HDL and LDL), but it may need a combination with other lipid lowering drug to decrease TGs and vLDL.

INTRODUCTION:

Plasma lipids consist of triacylglycerols (16%), phospholipids (30%), cholesterol (14%) and cholesteryl esters (36%) and a much smaller fraction of unesterified long-chain fatty acids (4%). This latter fraction, the free fatty acids (FFA), is metabolically the most active of the plasma lipids.

Plasma lipids are transported in complexes called lipoproteins. Metabolic disorders that involve elevations in any lipoprotein species are termed hyperlipoproteinemias or hyperlipidemias. Hyperlipidemia denotes increased levels of triglycerides.

Hyperlipidemia has become one of the most common problems in day-to-day’s life. The sedentary life today has particularly enhanced its risk. It has become a house-to-house disorder, especially in higher middle class and higher societies. Intake of fat and high carbohydrate rich diet style of India has also added to its risk for liver problems. The rate of acute liver failure associated with lovastatin is one per 1-1.1 million patient-treatment years, which is the same as the background rate of idiopathic acute liver failure.

Niacin:

Nicotinic acid is used primarily to increase HDL. Acute hepatic failure has been reported but is very rare.

mechanism

Decreases catabolism of apo A1 reduces VLDL secretion from liver. The typical pattern of injury involves elevation of aminotransferase levels although a mixed pattern of hepatocellular and cholestatic injury can be seen. This potential hepatotoxicity is common with sustained-release formulations (SR) but rare with immediate-release or extended-release (ER). The increase in liver toxicity with SR niacin chiefly occurred with doses >1500 mg/day.

Fibrates

Mechanism: peroxisome proliferator activated receptor-a (PPAR-a) agonists.

Some case reports have found that gemfibrozil results in cholestatic hepatitis and other rare reported cases of hepatocellular injury.

Fenofibrate was reported to be potentially involved in a case of hepatitis and fibrosis that was possibly increased due to use in combination with statins.

As a general rule, high doses of statin should be avoided in patients who are taking a fibrate. The risk of fibrate toxicity is higher in patients with impaired renal function, because these drugs are largely excreted by the kidney.

Ezetimibe

Mechanism: Blocks sterol transporter NPC1L1 in intestine brush border.

This drug inhibits intestinal absorption of cholesterol, but it enters the circulation and some authors found that it may in rare cases cause hepatotoxicity in the form of severe cholestatic hepatitis and acute autoimmune hepatitis.
In some case reports it was noted that the frequency of increased transaminases was potentially higher in patients receiving ezetimibe when associated with statins \(^{18}\).

**PATIENT AND METHODS:**
Research included collection of blood samples in Tabarak lab for pathologic analysis, and the patient’s number was (30) realistically (male, female), ages ranged (45-70), for the period from (20/7- 25/10 ; 2017). Blood samples were collected, then blood was up process centrifugal separation (3000 RPM ) for 5 minute , after that it was measured the levels of lipid profile (TGs, HDL, LDL, and vLDL) by using specific kits and depending on the protocol supplied with the kits.

**RESULTS:**
Results showed the presence of normal HDL and LDL in the patients taking lipid lowering drugs in compare with the control group, as represented in the figures (2 and 3) respectively. While TGs and vLDL levels were still high in these patients in compare with the control group as showed in the figures (1 and 4) respectively.

Figure 1 : The levels of TGs in patients taking lipid lowering drugs in compare with the control group.

Figure 2 : The levels of HDL in patients taking lipid lowering drugs in compare with the control group.
DISCUSSION:
The results showed significant effects of lipid lowering drugs to decrease the elevated levels of LDL, and this result reflects part of the efficiency of these drugs which accompanied with the other previous results, that showed that large-scale, prospective, randomized trials have demonstrated that intensive statin therapy significantly reduces lipid levels and the incidence of coronary events in individuals with low or average cholesterol levels. Also its showed that most effective agents for reducing LDL levels are the HMG-CoA reductase inhibitors (“statins”), because they block cholesterol synthesis at its rate limiting step [6, 8, 19, 20]. For the vLDL and TGs, levels stilled elevated, and this may be related to the doses used, as a previous study showed that high-dose simvastatin therapy significantly decreases TRL-TG in obese diabetic subjects and indicates that this reduction appears to be attributable to increased TRL-TG clearance rather than to decreased production. The most likely cause is an increase in intravascular lipolytic activity [19].
Or it may explained as the statins may need combination with other lipid lowering drug like ezetimibe and nicotinic acid which form effective combination, significantly increases HDL while decreasing LDL, TGs and total cholesterol) but its adverse side effects can limit its usefulness because of decreased patient compliance [21], or it may be related to the patients themselves and the irregular use of statins, or to the use of low effectiveness value drugs mark.

REFERENCES:
2- Grundy SM, Cleeman JI, Daniels SR, Donato KA, Eckel RH, Franklin BA, et al; American Heart Association; National Heart, Lung, and Blood Institute. Diagnosis and management of the


