Atorvastatin (Lipitor)

Atorvastatin is an HMG-CoA reductase inhibitor and belongs to the statin class of medications. These medications end with the suffix “-statin” and are relatively similar. Statins inhibit the enzyme HMG-CoA reductase, which normally catalyzes the rate-limiting step in cholesterol biosynthesis. Inhibition of this enzyme results in reduction of levels of bad cholesterol (LDL) and triglycerides and increasing levels of good cholesterol (HDL). Statins are indicated in the treatment of hypercholesterolemia. Side effects can include rash, hepatotoxicity, and myopathy, potentially leading to rhabdomyolysis. Therefore, it is recommended that liver enzymes be monitored at the onset of therapy and repeated if signs of liver damage develop. HMG-CoA reductase inhibitors should be taken at bedtime, and grapefruits and their juice should be avoided, as they can interfere with statin metabolism via the cytochrome P450 enzyme pathway.



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Characteristics

-statin Suffix
Statue
Drugs in this class end with the “statin” suffix and generally have a similar mechanism of action and effect.

Mechanism

HMG-CoA Reductase Inhibitors
Hummingbird Coin-A-purse with Red-duck and Inhibiting-chains
Statins inhibit the enzyme HMG-CoA reductase, which normally catalyzes the rate-limiting step in cholesterol biosynthesis. HMG-CoA reductase inhibitors are effective at decreasing low-density lipoprotein (LDL) and total cholesterol levels. Further, this class may increase the “good cholesterol,” referred to as high-density lipoprotein (HDL), and decrease triglycerides. This mechanism has been found to decrease the risk of heart disease and sudden death.

Indications

High Cholesterol
High Cholesterol-burger
HMG-CoA reductase inhibitors are indicated for the treatment of high cholesterol levels (hypercholesterolemia). This class of medications decreases the “bad cholesterol” (low-density lipoprotein, LDL) and triglycerides while simultaneously increasing the “good cholesterol” (high-density lipoprotein, HDL). However, the effects on HDL are a little more variable.

Side Effects

Hepatotoxicity
Liver with Toxic-green-glow
Hepatotoxicity may occur in patients receiving statin medications. The liver is responsible for the production of cholesterol; therefore, these medications may cause injury to hepatocytes. If signs or symptoms of liver injury, such as jaundice, develop, liver function tests should be performed.

Rash
Rash
One of the side effects of statins is the development of a rash. Statins can occasionally lead to various dermatologic adverse effects. These reactions range from mild rashes to severe cutaneous eruptions. Common dermatologic reactions are Eczematous Dermatitis, Lichenoid Drug Eruption, Erythema Multiforme, Vesiculobullous and Pustular Eruptions, Drug Reaction with Eosinophilia and Systemic Symptoms.

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Rhabdomyolysis

Raptor-muscle-lights

Rhabdomyolysis, or the breakdown of muscle cells, can occur with statin use. Statins can damage myocytes and lead to myopathy. If this persists, rhabdomyolysis can occur as damaged cells release myoglobin into the bloodstream. This myoglobin is filtered into the kidneys and broken down into heme pigment. Heme pigment is toxic to the kidneys and results in acute kidney injury (AKI). A mainstay of treatment is judicious IV hydration.

Myopathy

Mayo-party-hat

Myopathy, or injury to muscle tissue, may occur with high-dose statin use. Patients receiving statin therapy should be monitored for diffuse or local muscle aches, weakness, and tenderness. Creatinine kinase (CK) levels in the serum can be checked to assess for muscle cell damage in myositis or the more severe problem of rhabdomyolysis.

Considerations

Monitor Liver Enzymes

Monitor with Liver Enzymes

Because statins may cause liver damage, liver enzymes should be checked before starting this medication and repeated if clinical concern for liver damage arises.

Administer at Bedtime

Eating in Bed

The liver produces the majority of cholesterol at nighttime. For this reason, it is recommended that statins be administered at bedtime. However, certain statins, including atorvastatin, are approved by the FDA to be taken at any time of the day while others, like simvastatin, need to be taken at night.

Avoid Grapefruit

Avoid-sign Grapefruit

Grapefruits and their juice should be avoided in patients taking statins because grapefruits contain chemicals that inhibit the enzyme CYP3A4, causing levels of the statin to rise.

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