



# Statins in Liver Disease: Oh the Pain!

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## Case Presentation

**HPI:** A 42-year-old female with **cryptogenic cirrhosis**, Type II diabetes mellitus, hyperlipidemia, pancytopenia, and awaiting liver transplant presents with acute progressive **myalgias** and proximal muscle **weakness** with **dark urine** over five days. Review of systems was negative for fever and upper respiratory symptoms, but positive for a recent sick contact and increase in **atorvastatin** dosing a month prior.

### Medications:

- atorvastatin 40 mg daily
- insulin glargine
- insulin aspart
- Vitamin D3
- furosemide
- lactulose oral solution
- metformin
- spironolactone

### Social History:

- remote drinking history
- no IVDU
- no other drug use

### Physical Exam:

- Vital signs: normal (BP 106/90 mmHg)
- HEENT: scleral icterus
- MSK: moderate **tenderness** of bilateral thighs, calf muscles, shoulders
- Neurologic: 4 / 5 UE and LE proximal muscle **weakness**

### Labs:

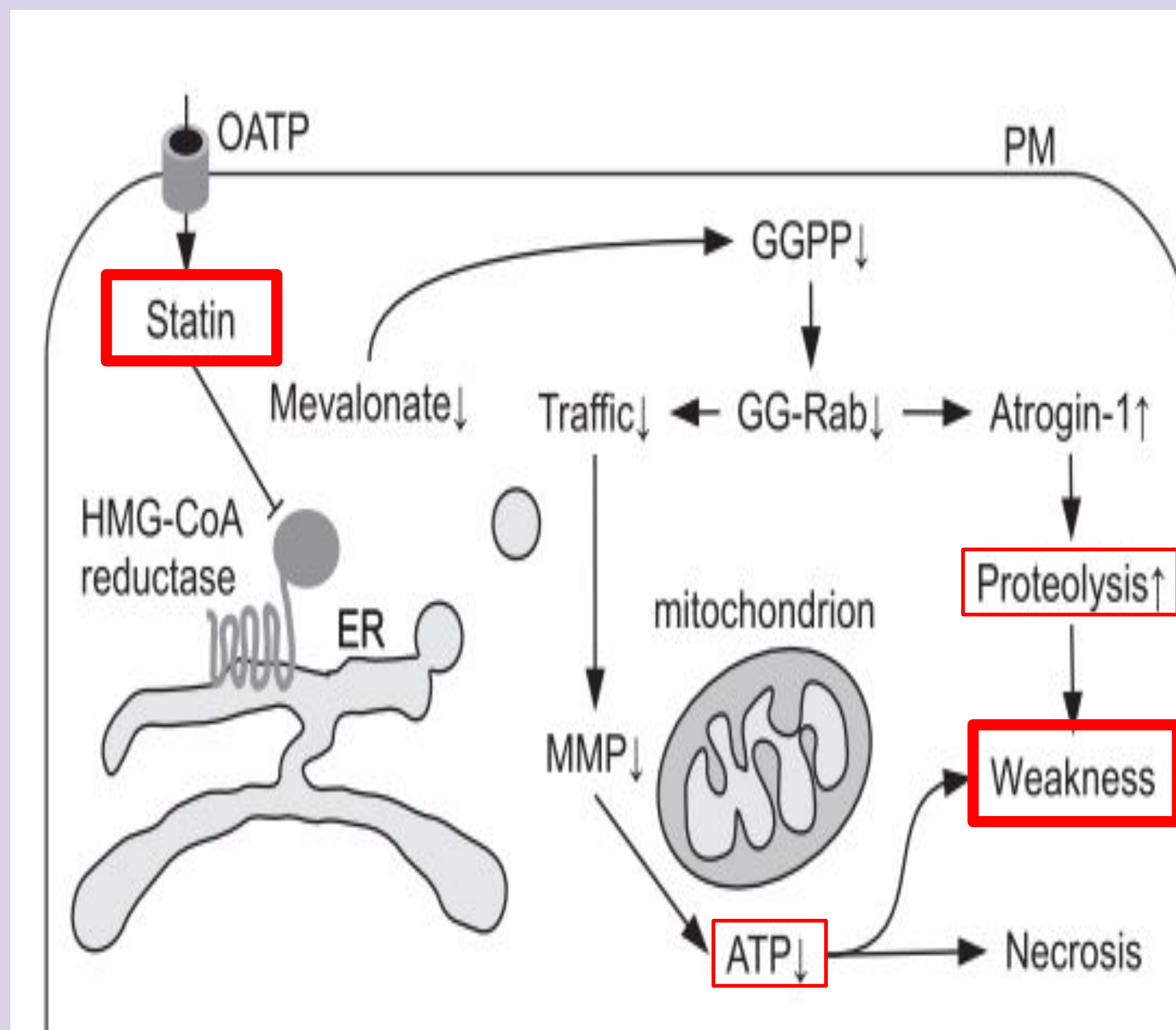
- CK 7500 U/L
- chronic pancytopenia
- normal electrolytes except K 3.1 mmol/L
- Cr 1.32 mg/dL (prior 0.6 mg/dL)
- AST 540 U/L, ALT 135 U/L, AP 297 U/L
- Total bilirubin 7.0 mg/dL
- albumin 1.5 g/dL
- normal ESR, CRP, and thyroid function

### Other tests:

- **Viral testing negative** for adenovirus, coronavirus, metapneumovirus, influenza A/B, parainfluenza, RSV, Bordetella pertussis, Chlamydomphila pneumoniae, Mycoplasma pneumoniae, rhinovirus/enterovirus, HIV, CMV, and EBV.

## Brief Hospital Course

She was admitted for management of **rhabdomyolysis** and treated with **aggressive IV hydration**. After hydration, patient had return of muscle strength, CK levels gradually improved, and her renal function normalized.

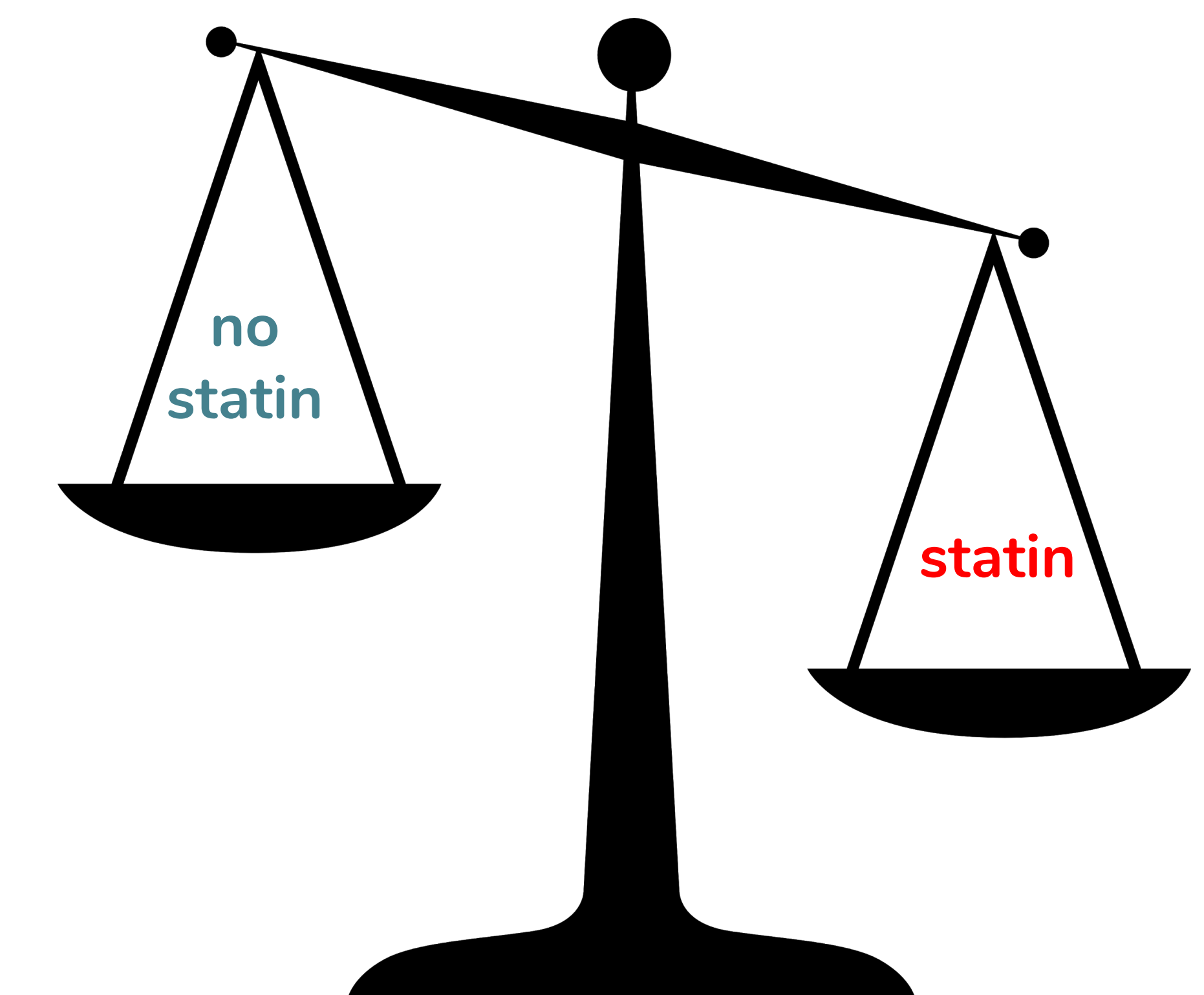


**Figure 1.** Scheme for statin-induced rhabdomyolysis.

ER: endoplasmic reticulum, GGPP: geranylgeranylpyrophosphate, GG-Rab: geranylgeranylated Rab GTPase, MMP: mitochondrial membrane potential, OATP: organic anion transporting polypeptide, PM: plasma membrane.<sup>3</sup>

## Discussion

- Statins can lead to rhabdomyolysis by inhibiting **HMG-CoA reductase**. This causes a decrease in mitochondrial ATP synthesis and an increase in proteolysis, leading to muscular weakness.
- **Myalgias** from statin use occur in **1-10%** of the general population, while **rhabdomyolysis** occurs less than **0.1%** of the time. The risk is **dose-dependent**.
- However, routine monitoring of liver enzymes is ineffective in assessing who will develop liver injury from statin therapy.
- **Decompensated liver cirrhosis** and **acute liver failure** are still **contraindications** to statin use.
- On the other hand, patients with **liver disease** have an increased risk of **cardiovascular disease**.
- Statins also slow progression of fibrosis, prevent hepatic decompensation, and may **reduce all-cause mortality** in patients with chronic liver disease.
- Overall, statin therapy in patients with chronic liver disease is likely **more beneficial than harmful**.



## Teaching Points

### Teaching point 1:

- Rhabdomyolysis is a rare complication of statin therapy.

### Teaching point 2:

- Clinicians should be aware of the potential increase in the use for patients with cirrhosis due to reduction in cardiovascular disease and all-cause mortality. The overall benefit likely outweighs the risk.

## References

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