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Treatment for High Cholesterol: Statins or Bempedoic Acid?

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Clinic Scenario

A **58-year-old female** patient's bloodwork **indicates high levels of cholesterol**. The standard of care for high cholesterol is the use of statins; however, the patient has had non-life threatening but **adverse side effects to statins**, such as myalgia.

The clinical dilemma here is whether to prescribe the first-line treatment of high cholesterol control with **statin** medication knowing that it would cause **adverse effects** and risk the lack of adherence, or to switch to the less effective second-line treatment of **bempedoic acid**.

Background

It is essential to monitor cholesterol levels as high serum cholesterol levels, also known as hypercholesterolemia, can lead to atherosclerotic cardiovascular diseases such as myocardial infarction, acute coronary syndrome, stroke, and peripheral arterial disease.[1]

Lipid Panel[2]	Optimal	High
Total cholesterol level	< 200 mg/dL	≥ 240 mg/dL
LDL cholesterol level	< 100 mg/dL	≥ 160 mg/dL

Risk Factors:

- Lack of physical activity, obesity, alcohol use, cigarette use, and high carbohydrate diets.[2]
- Predisposed conditions such as type 2 diabetes, chronic kidney disease, hypothyroidism, and cholestatic liver diseases.[2]
- Familial hypercholesterolemia (less common than natural causes).[3]

Treatment/Management (outside of lifestyle management):

- First line treatment: **Statins** inhibit HMG-CoA reductase that is necessary in cholesterol synthesis and thus lowering the total cholesterol content.[4, 5] Statins are also used beyond its control for cholesterol levels and also used for prevention of cardiovascular diseases as well.[5] However, some patients report **adverse side effects** to statins such as myalgia, making these patients have **statin intolerance**.[5, 6]
- Comparative option: **Bempedoic acid** is an adenosine triphosphate-citrate lyase inhibitor, causing inhibition of cholesterol synthesis in the liver.[7] Although not as effective as the statins, patients who are unable to take statins may not experience adverse effects with bempedoic acid.[7]

PICO Question

In adults with **hypercholesterolemia** that have **intolerance to statins** due to adverse side effects such as myalgia, how does **bempedoic acid treatment compare with the current standard of care** with the use of statins to lower cholesterol while reducing adverse effects and increasing adherence?

Search Strategy

To perform the literature search, I entered the following into the search bar in PubMed and filtered the results for "Randomized Controlled Trial"

"Bempedoic acid" AND statin AND cholesterol

Conclusion

With the information from the literature search, the following:

- Bempedoic acid is effective in lowering LDL cholesterol levels to a similar degree to the reduction seen in statins.
- Levels of myalgia from bempedoic acid is no different than placebo.
- Bempedoic acid lowers cardiovascular risk.

With evidence showing no difference in the reduction of cholesterol between statin and bempedoic acid, bempedoic acid may offer an effective solution to decreasing cholesterol, especially in patient with adverse statin side effects. This is in contrast to the current paradigm of cholesterol treatment, and a larger study comparing the side effects of statins and bempedoic acid may be investigated as future avenues of research.

Search Results

Study	Study Aim	Study ID	Design	Patients	Comparisons	Outcome	Results
Bempedoic Acid and Cardiovascular Outcomes in Statin-Intolerant Patients[8]	Determining the effect of bempedoic acid on patients with statin-intolerant patients	Nissen SE, Lincoff AM, Brennan D, et al. 2023	RCT, double blind	13,970 total patients from the ages of 18-85 years old with inability to receive statin therapy with elevated cholesterol	180 mg of bempedoic acid once daily group vs. placebo	LDL cholesterol level, high sensitivity CRP level, hazard ratio, adverse effects	Bempedoic acid decreased LDL cholesterol levels by 21.1% compared to placebo with lower risk of major adverse cardiovascular events, no change in myalgia compared to placebo
Comparative Cardiovascular Benefits of Bempedoic Acid and Statin Drugs[9]	Comparing the effect of statin and bempedoic acid on cardiovascular benefit and LDL-C lowering capability	Lincoff AM, Ray KK, Sasiela WJ, et al. 2024	RCT, double blind	4,206 total patients from ages of 18-85 years old with baseline LDL-C level of 100 mg/dL or higher	Magnitude of difference between bempedoic acid group vs placebo compared against reported LDL level decrease ratio with statins	LDL cholesterol levels, hazard ratio, adverse effects	Bempedoic acid reduced the levels of LDL cholesterol to a similar level achieved by statins
Bempedoic acid in patients with type 2 diabetes mellitus, prediabetes, and normoglycaemia[10]	Determining the effect of bempedoic acid on lipid levels and glycemic control in patients with hypercholesterolemia	Leiter LA, Banach M, Catapano AL, et al. 2021	RCT, double blind	3621 total adult patients with hypercholesterolemia on maximally tolerated statins stratified with glycemic status	180 mg of bempedoic acid once daily group vs. placebo	LDL cholesterol levels and HbA1c levels	Bempedoic acid lowered the LDL cholesterol levels and no change in adverse effects compared to placebo

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