Early Onset Atherosclerosis And Dyslipidemia In A 22-year-old Male With Extremely Low HDL-C

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INTRODUCTION

Atherosclerosis is a progressive condition of plaque buildup in arteries and is often associated with high-risk conditions like hypercholesterolemia, smoking, hypertension etc. However, in young adults, atherosclerosis can indicate underlying genetic conditions which may predispose them to cardiovascular diseases. Lipoproteins are molecules made of lipids and proteins, whose primary function is to transport lipids like triglycerides and cholesterol in the blood stream. **Dyslipidemia** is abnormal levels of lipid in the blood. HDL has protective function and helps in the reverse transport of cholesterol, thus decreasing cholesterol content in the blood. Thus, extremely low HDL-C is rare but can significantly increase the probability of cardiovascular diseases.

CASE REPORT

A 22-year-old male presents to the ER with complaints of excessive sweating, tightness in the chest and rapid breathing. Upon inspection, the patient appears healthy and has no history of smoking, alcohol or drug use. There is also no family history of cardiovascular diseases; however, the patient acknowledges a sedentary lifestyle. Initial examination shows a pulse rate of **112** beats per minute, blood pressure of **140/90 mm Hg** and a respiratory rate of **22 breaths per minute** with oxygen saturation of 94% in room air. An ECG was **normal**, but coronary angiogram showed **80% narrowing** of the left anterior descending (LAD) artery. Laboratory findings show normal complete blood count, total cholesterol of **234 mg/dL**, a low-density lipoprotein level of **165 mg/dL** and an exceptionally low level of high-density lipoprotein levels at **6 mg/dL**.

MANAGEMENT

Two strategies may be employed to increase HDL-C, thus decreasing atherosclerosis:

1) **Intravenous Apo A-1 infusion** – studies have shown that *Apo A-1* therapy helps reduce the risks of atherosclerosis by increasing reverse cholesterol transport as well as suppressing endothelial adhesion. The results of short-term Apo A-1 infusion are comparable to long-term statin use generally provided in similar cardiovascular diseases.

2) **Decreasing catabolism of Apo A-1/HDL-C** – Cholesterol Ester Transfer Protein (CETP) helps transport the cholesteryl esters from HDL towards LDL and VLDL. Thus, inhibition of CETP via a drug like *Dalcetrapib* which forms an irreversible bond with CETP causes an increase in HDL-C.

DISCUSSION

The novelty in this case arises from the **absence of high-risk conditions** usually present in such a severe case of atherosclerosis, like a family history of cardiovascular conditions or presence of conventional risk factors like frequent smoking, drug or alcohol use. This paired with the worrying blood test results, specifically the drastic decrease in HDL indicates a genetic abnormality causing early onset atherosclerosis not brought about by lifestyle choices. The ECG is normal, whereas most atherosclerotic patients present with changes in the ECG due to decreased blood flow to the heart, leading to **myocardial ischemia** and **necrosis**. The age of the patient is also a cause of concern as most healthy 22-year-olds do not present with these symptoms.

CONCLUSION

In conclusion, this case study highlights the critical need to recognize early-onset atherosclerosis, particularly in young adults who present with **severe manifestations and intense dyslipidemia yet lack conventional cardiovascular risk factors**.