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Commentary

Recent Advances in Lipidology and Their Implications for Angina Pectoris Prevention

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DESCRIPTION

Angina pectoris, characterized by chest pain due to insufficient blood flow to the heart muscle, is a leading symptom of Coronary Artery Disease (CAD). While the condition remains a significant health concern worldwide, recent advancements in lipidology the study of lipids in the body have opened new avenues for preventing angina and reducing the risk of cardiovascular events. These advances not only deepen our understanding of the role of lipids in heart disease but also offer innovative strategies to prevent, manage, and even reverse the course of angina pectoris.

Lipids and angina pectoris

At the core of angina pectoris lies the accumulation of fatty deposits or plaques in the coronary arteries, a process known as atherosclerosis. These plaques are primarily composed of cholesterol and other lipids, which, over time, narrow the arteries and reduce blood flow to the heart. The most significant lipid involved in this process is Low-Density Lipoprotein (LDL) cholesterol, often referred to as bad cholesterol. High levels of LDL cholesterol in the bloodstream can contribute to plaque formation and increase the risk of angina, heart attack, and stroke. Traditionally, managing lipid levels, particularly LDL cholesterol, has been the basis of preventing and treating CAD. Statins, drugs that lower LDL cholesterol, have been the most widely used therapy for this purpose. However, recent advances in lipidology have led to the development of more targeted therapies and a better understanding of lipid metabolism, providing new tools in the fight against angina pectoris and other cardiovascular conditions.

Advances in lipid-lowering therapies

One of the most significant breakthroughs in lipidology is the development of Proprotein Convertase Subtilisin/Kexin type 9 (PCSK9) inhibitors. PCSK9 is a protein that inhibits the liver's ability to remove LDL cholesterol from the bloodstream. By inhibiting PCSK9, these drugs such as alirocumab and evolocumab can significantly lower LDL cholesterol levels beyond what is achievable with statins alone. Clinical trials have shown that PCSK9 inhibitors not only lower LDL cholesterol but also reduce the incidence of major cardiovascular events, including heart attacks and strokes, in high-risk patients. The introduction of bempedoic acid, another lipid-lowering agent, has also contributed to advancements in lipidology. This drug works by inhibiting an enzyme involved in cholesterol synthesis in the liver, leading to a reduction in LDL cholesterol levels. Bempedoic acid is often used in combination with statins or PCSK9 inhibitors for patients who require additional lipid-lowering therapy. These new agents offer hope for patients who have difficulty reaching optimal cholesterol levels with statins alone, particularly those with familial hypercholesterolemia or other genetic predispositions to high cholesterol. Another innovative class of drugs is inclisiran, a small interfering Ribonucleic Acid (siRNA) therapy that targets PCSK9 messenger RNA (mRNA), thereby preventing the production of PCSK9 protein. This long-acting therapy has been shown to reduce LDL cholesterol levels by up to 50%, with effects lasting for several months. The convenience of fewer injections and the potential for long-term LDL reduction makes inclisiran a potential option for patients with CAD and angina pectoris.

Non-lipid factors: Role of inflammation

Lipidology has also expanded to encompass the role of inflammation in cardiovascular disease. While elevated cholesterol levels are a major risk factor for atherosclerosis, inflammation is the driving force behind plaque instability and rupture, which can lead to angina or myocardial infarction (heart attack). Recent research has underscored the need to address both lipid levels and inflammatory markers to prevent cardiovascular events effectively. The use of C-Reactive Protein (CRP) as an inflammatory biomarker has gained attention in the context of cardiovascular disease. Elevated CRP levels are associated with a higher risk of atherosclerosis and adverse cardiovascular events. New therapies, such as canakinumab, an interleukin-1β inhibitor, have been shown to reduce CRP levels and lower the risk of heart attacks. Although these therapies are not yet standard treatment, they highlight the growing recognition that managing inflammation,

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alongside lipid levels, is essential for preventing angina pectoris and other heart-related conditions.

CONCLUSION

Recent advances in lipidology have revolutionized the approach to preventing and treating angina pectoris. The development of new therapies that target LDL cholesterol, HDL cholesterol, and inflammation offers significant potential to reduce the risk of cardiovascular events, including angina. As the field of lipidology continues to evolve, these innovations will undoubtedly have a profound impact on preventive cardiology, offering new hope for millions of individuals at risk for CAD. With the right combination of therapies and personalized approaches, the prevention of angina and its complications is more achievable than ever before.