

Editorial

ASCVD- Should We Treat It or Eradicate?

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Editorial Note

Atherosclerotic cardiovascular disease (ASCVD) is a leading global health concern, significantly contributing to acute cardiovascular events such as myocardial infarction and ischemic stroke. Research consistently links elevated levels of low-density lipoprotein cholesterol (LDL-C) to ASCVD. Preventive measures and early interventions can mitigate the disease's progression [1]. Yet, despite advancements in medical treatments and the known benefits of lifestyle modifications like exercise and reduced saturated fat intake, ASCVD mortality rates continue to rise globally. Modern medical practices often fall short of eradicating ASCVD risk, emphasizing the need for more precise and proactive approaches. Delayed or inappropriate care amplifies the risk and complications of ASCVD, urging the necessity for improved preventive guidelines and risk assessment tools.

Elevated Low-density lipoprotein cholesterol (LDL-C) levels play a pivotal role in the progression of Atherosclerotic cardiovascular disease (ASCVD). Studies reveal a direct relationship between LDL-C levels and ASCVD risk, necessitating guidelines for LDL-C reduction. Despite the guidelines recommending statins as first-line therapy for lowering LDL-C [2], many patients fail to meet the thresholds. These guidelines face challenges in being up-to-date, personalized, and comprehensible. Medical practitioners often delay adopting new therapeutic approaches, resulting in many patients with dyslipidemia going untreated [3, 4]. Moreover, within six months, half of the high-risk patients discontinue statin therapy prematurely, increasing their ASCVD risk. Early and accurate assessment tools for atherosclerosis are underused. The essence of medicine involves tailoring scientific evidence to individuals. The understanding of atherosclerosis at molecular and lifestyle levels has expanded. National and international guidelines recommend lipid-lowering drugs based on cardiovascular risk calculations, with variations in prediction tools and thresholds.

The potential of anti-inflammatory treatments [5] and upcoming vaccines offers promise, but early intervention remains essential for effective atherosclerosis management.

ASCVD, often silently progressing, can result in severe conditions like myocardial infarction and sudden cardiac death. Emphasizing the importance of controlling ASCVD risk factors, the American Heart Association outlines eight primary factors, collectively known as AHA life's essential Metrics, to minimize CVD lifetime risk [6]. Primordial prevention focuses on lifestyle habits to pre-empt the development of ASCVD risk factors. Inflammation plays a crucial yet complex role in ASCVD, both beneficial and detrimental. Prompt anti-inflammatory treatments post-AMI could protect against subsequent myocardial injuries. ASCVD's origins trace back to early life, suggesting preventive measures should begin in childhood. The gut's microbial environment affects atherosclerosis development, with certain bacterial actions influencing the disease. Numerous cofactors, from inflammation to environmental pollutants, can damage endothelial walls, contributing to atherosclerosis, underscoring the need for comprehensive research and management [7].

Multiple studies have shown the relationship between low-density lipoprotein (LDL-C) and the risk of coronary atherosclerosis progression. For lifelong prevention of atherosclerosis, maintaining LDL-C below 85 mg/dl is ideal, but aiming for below 40mg/dl is optimal, albeit challenging. Keeping LDL-C under 85mg/dl throughout one's life could postpone severe complications till the age of 100. Moreover, reducing LDL-C levels early in life can be more effective in reducing coronary heart disease (CHD) risk than later interventions.

LDL-C is viewed as a vascular toxin with detrimental effects on the endothelial wall, fostering inflammation and other adverse changes [8]. The pathogenesis of atherosclerosis emphasizes early LDL-C management; once atherosclerosis starts, it becomes

increasingly resistant to interventions. Inflammation plays a pivotal role, but by keeping LDL-C levels extremely low early on, inflammation's impact can be mitigated.

Lifestyle management is paramount for preventing atherosclerotic cardiovascular disease (ASCVD). This includes weight management, stress reduction, dietary changes, and quitting smoking. Sustained commitment to these strategies can be challenging but is crucial for effective prevention. Genetics also plays a role in ASCVD risk, making early detection and treatment vital, especially for conditions like Familial hypercholesterolemia. Notably, certain treatments can even reverse atherosclerosis [9].

Early assessment tools, like the coronary artery calcium (CAC) scoring method, are instrumental for detecting early atherosclerosis and guiding preventive strategies [10]. Effective ASCVD management considers the concentration of LDL-C and its duration of exposure to the arterial wall. The earlier and faster hypercholesterolemia is managed, the better. It's suggested that LDL-C levels below 60-80 mg/dl can start reversing atherosclerotic plaques. Early screening, even from birth, is beneficial, utilizing techniques like 2D-B-mode-ultrasound. Pregnant women have an elevated risk, and early interventions post-pregnancy are imperative. While statins are currently used minimally in children,

they've been shown to be effective and safe for those as young as 8 (Table 1, 2).

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Table 1: What we know.

Neurocognitive effects	The CANTAB tests reveal no notable neurocognitive changes with significant LDL-C reduction.
LDL-C's Role in Atherosclerosis	Mendelian studies show that lower LDL-C levels reduce atherosclerosis and related events.
LDL-C Measurement Debate	The emphasis is on the actual LDL-C level, indicating its pivotal role in atherosclerosis.
LDL-C's Toxicity	LDL-C acts as a vascular toxin, accelerating atherosclerosis.
Early Intervention	Managing LDL-C early leads to better outcomes, akin to treating conditions like hypertension.
Atherosclerosis Nature	It's an inflammatory disease. Low early LDL-C levels prevent inflammation and treatment resistance.
Early Treatment Benefits	Addressing atherosclerosis early can alter its course, protecting the youth from future risks.
Atherosclerosis Reversal	Studies like PACMAN-AMI indicate potential atherosclerosis regression with proper treatment.
Risk Assessment Precision	Early, detailed risk assessments, considering all health factors, optimize outcomes.
CAC Utility	CAC is a cost-effective, reliable tool for early atherosclerosis detection.

Table 2: Future Perspective.

Atherosclerosis Priority	Atherosclerosis results in disease, disability, and death; its prevention and management are paramount.
LDL-C Significance	The level and exposure duration of LDL-C, with other enhancing factors, dictate risk. Lowering high LDL-C quickly is essential.
Early Risk Detection	Start screening for conditions like Familial Hypercholesterolemia from birth.
Factor Management & Detection	Address controllable factors, especially arterial plaque. Tools like 2D B-mode ultrasound aid in early atherosclerosis identification.
Treatment & Specific Groups	LDL-C targets change based on severity and risks, with some cases requiring below 20 mg/dl. For high-risk children and women with unique factors like pregnancy complications, early and post-natal treatment is vital.
Urgent Response	The severe impact of atherosclerosis outweighs financial considerations. The aim is a rarity, necessitating immediate, comprehensive action from healthcare professionals.