Mechanism of familial hypercholesterolemia during childhood genetic diagnosis.

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Abstract

One of the most prevalent illnesses that doctors encounter is hypercholesterolemia. It continues to be one of the main modifiable cardiovascular risk factors, and significant improvements in risk classification techniques and viable treatment choices have been made. The development of Peripheral Vascular Disease (PVD) and Coronary Artery Disease (CAD) have been repeatedly linked to total cholesterol levels above 200 mg/dl and much attention has been paid to evaluating the mechanisms by which hypercholesterolemia may affect these outcomes. It has been clearly illustrated that the progression of hypercholesterolemia is linked to endothelial cell dysfunction, a near total loss of vascular nitric oxide bioavailability, increased oxidative stress, and the development of a strongly pro-inflammatory condition; symptoms that can result in significant impairments/alterations to vascular reactivity.

Keywords: Hypercholesterolemia, Cholesterol, Lipoprotein, Cardiovascular disease.

Introduction

Due to the accumulation of extra cholesterol in various tissues, inherited forms of hypercholesterolemia can also result in health complications. Tendon xanthomas are distinctive growths that develop when cholesterol builds up in tendons. The tendons in the hands, fingers, and Achilles tendon are most frequently affected by these growths. Xanthelasmata are yellowish cholesterol deposits under the skin of the eyelids. A grey ring known as an arcus cornealis can develop when cholesterol builds up around the corners of the cornea, the clear front surface of the eye [1].

A genetic condition called familial hypercholesterolemia exists. A flaw on chromosome 19 is the root of the problem. Low density lipoprotein, or "bad" cholesterol, cannot be excreted from the body as a result of the abnormality. High blood levels of LDL are the result of this. You are more prone to experience early-onset atherosclerosis and artery constriction if your LDL cholesterol levels are high. Usually, the disease is autosomal dominantly passed down through families. Therefore, in order to inherit the condition, just one parent's normal gene is required.

Due to the function that lipoproteins play in atherogenesis and the danger that they pose for Atherosclerotic Cardiovascular Disease (ASCVD), lipoprotein abnormalities are clinically significant. The findings on the reduction in atherosclerotic cardiovascular disease events with statin medicines among people without cardiovascular disease (primary prevention) are very well documented. Acute pancreatitis is more likely to develop in patients with triglyceride levels over 1000 mg/dl. LDL cholesterol levels over 190 mg/dl, greater than 160 mg/dl with one major risk factor, or greater than 130 mg/dl with two cardiovascular risk factors are considered to be high cholesterol [2].

Hypercholesterolemia has both acquired and inherited causes. The most common genetic condition is familial hypercholesterolemia, which is brought on by mutations in the LDL-receptor gene that cause LDL-C levels to exceed 190 mg/dl in heterozygotes and 450 mg/dl in homozygotes. Familial hypercholesterolemia is at least 85% the result of this LDL receptor deficiency. Mutations in the LDL receptor gene that result in loss of function are the root cause of familial hypercholesterolemia. LDL is removed from the bloodstream at a slower rate as a result of the liver's decreased LDL receptor function [3].

The above genetic factors are all autosomal dominantly transmitted. Autosomal recessive hypercholesterolemia is a rare genetic condition that is caused by a mutation in the LDL receptor adaptor protein, which leads to improper endocytosis of the LDL receptors. The most frequent cause, however, is polygenic hypercholesterolemia, which is brought on by the interaction of unknown hereditary factors, a sedentary lifestyle, and a higher intake of saturated and Tran's fatty acids. Hypothyroidism, nephrotic syndrome, cholestasis, pregnancy, and some medications like cyclosporine, thiazide, and diuretics are examples of secondary causes. By using the history, physical exam, and laboratory tests, they can be easily ruled out [4].

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The increased LDL particles are thought to penetrate the vascular intima and become caught by proteoglycans there. The LDL receptor is either dysfunctional or absent in familial hypercholesterolemia. The receptor is necessary for the liver to absorb cholesterol. Typically, the liver breaks down two thirds of the LDL in circulation. There have been hundreds of LDL receptor mutations discovered, and these abnormalities manifest as hypercholesterolemia [5].

Conclusion

As a result, hypercholesterolemia is a huge problem that needs to be addressed. As medical professionals, it is in our best interests to enrol more patients in effective treatments like statins because they are now mainly generic and affordable. For the general population, LDL-C should be less than 100 mg/dl. The target level for LDL-C in patients with atherosclerotic cardiovascular disease should be less than 70 mg/dl or a 50% decrease. Others should aim for an LDL-C below 100 mg/dl or a 30% to 50% decrease in LDL-C. Adverse cardiac events are the main hypercholesterolemia risk. However, many studies have shown a considerable decline in the mortality linked to hypercholesterolemia since the advent of statins. Today, decreasing cholesterol is a helpful method for heart disease's primary prevention.

References

1. Radaelli G, Sausen G, Cesa CC, et al. Secondary dyslipidemia in obese children - Is There Evidence For Pharmacological Treatment? Arq Bras Cardiol. 2018;111(3):356-361.
2. Zawacki AW, Dodge A, Woo KM, et al. In pediatric familial hypercholesterolemia, lipoprotein is more predictive than LDL-C for early onset of cardiovascular disease in family members. J Clin Lipidol. 2018;12(6):1445-1451.
3. Wiegman A. Lipid screening, action, and follow-up in children and adolescents. Curr Cardiol Rep. 2018;20(9):80.
4. Dainis AM, Ashley EA. Cardiovascular precision medicine in the genomics era. JACC Basic Transl Sci. 2018;3(2):313-326.
5. Mytilinaiou M, Kyrou I, Khan M, et al. Familial hypercholesterolemia: new horizons for diagnosis and effective management. Front Pharmacol. 2018;9:707.

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