Atherosclerosis : An Overview

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Atherosclerosis is the narrowing of arteries due to plaque buildup on the artery walls. Arteries carry blood from the heart to the rest of the body. A thin layer of cells forms a lining that keeps them smooth and allows blood to flow easily. This is called the endothelium. Atherosclerosis happens when the endothelium becomes damaged, due to factors such as smoking, high blood pressure, or high levels of glucose, fat, and cholesterol in the blood. This damage allows a collection of substances, known as plaque, to build up in the artery wall. These substances include fat and cholesterol.

Over time, plaque can build up and become hard. If plaque continues to collect, it can block the artery and disrupt the flow of blood around the body. Sometimes, pieces of plaque break open. If this happens, particles from blood cells, known as platelets, gather in the affected area. These can stick together, forming blood clots. A clot can block the artery, leading to life threatening complications, such as stroke and heart attack. Atherosclerosis can affect any artery, but it mainly occurs in the larger, high pressure arteries.

Atherosclerosis has been derived from a Greek word, Athero meaning gruel. The earliest lesion is the fatty streak. Fatty streak evolve to fibrous plaque and unstable plaque are responsible for clinical events. Atherosclerosis is marked by atheromas, patchy intimal plaques. Most common location is lumen of medium sized and large arteries. The plaque has cellular component -namely of inflammatory cells, smooth muscle cells, a fibrous component of –connective tissue and a fat component of lipids. Prominent risk factors of consideration are Hypertension, Diabetes, Dyslipidemia, obesity, sedentary life style, Family history, smoking. Intraplaque rupture, bleeding, thrombosis and stenosis cause symptoms. Diagnosis is clinical and definitive diagnosis is made through Imaging tests. Management plan includes behavior modifications (Physical activity with low caloric diet, rich in fiber component) and main class of drugs used in treatment are antiplatelet drugs and antiatherogenic drugs.

In the previous issue Ruth Prabhu described about 'Role of Omega Fatty Acids in Atherosclerosis and Coronary Artery Disease'[1] and Why is Obesity A Risk Factor for Atherosclerosis?[2]

The role of omega-3 PUFAs in the treatment of atherosclerosis has shown a strong clinical efficacy. when omega-3s incorporate into the cellular membrane, they disrupt cholesterol rafts, changing the fluidity of cell membranes decreasing vascular tone.

The pathogenesis of obesity and atherosclerosis has several common factors. In both cases, lipids, oxidized LDL particles, and free fatty acids activate the inflammatory process and trigger the disease. Inflammation is responsible for all the steps towards atherosclerosis.

References

1. Prabhu R (2020) Role of Omega Fatty Acids in Atherosclerosis and Coronary Artery Disease. Atheroscler Open Access 5; 144: 1-2

2. Prabhu R (2020) Why is Obesity A Risk Factor for Atherosclerosis? Atheroscler Open Access 5; 143: 1-2.

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