Statins: Preventive Measure for Cardiovascular Disease in Elderly Population.

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ABSTRACT

Statins or HMGCoA reductase inhibitors are a group of medicine which effectively prevents cardiovascular disease due to the deposition of atherosclerotic plaques and hence the CV events in elderly population .It also possess inhibitory action on inflammation reaction, improve endothelial function and stabilize coronary plaques. Studies reveals that there is a significant decline in incidence of atherosclerotic CVD and more rigorous study is required to establish association between statin use and reduction in CVD death and all-cause mortality.

Keywords: Cardiovascular Disease, 3-Hydroxymethyl glutaryl Coenzyme A (HMGCoA) reductase inhibitors, Low Density Lipoprotein, Atherosclerosis, Type 2 Diabetes Mellitus.

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INTRODUCTION

Cardiovascular disease (CVD) is one of the globally facing issue and a chief contributor of morbidity and mortality in the elderly population. Coronary Artery Disease is the largest donator to CVD's due to Atherosclerosis (AS), a chronic inflammatory condition of coronary artery wall .Total cholesterol and low-density lipoprotein (LDL) Cholesterol elevation develops CVD risk. Lowering plasma high LDL cholesterol safeguard the vulnerable individuals suffering from Coronary Heart Disease (CHD) events and further complications. Statins or 3-Hydroxy-3-methylglutaryl Co enzyme A reductase inhibitors are class of lipid lowering of drugs and first choice of drug for regulating plasma LDL-Cholesterol .It also possess the inhibitory action on inflammation reaction, improve endothelial function and stabilize coronary plaques. Its usage is established for decades in all age groups and drug utilization pattern of statin in elderly has accelerated (2).

History

In the 1950s and 1960s, it became noticeable that increased concentration of plasma cholesterol represent a major risk factor for the development of heart disease which led to the inquiry for drugs that could reduce it.

On September 1 1987, Lovastatin became the first statin to be approved in USA by the FDA. This agent is responsible for the revolution in the treatment of hypercholesterolemia.

Simvastatin was proved for marketing in widen in 1988 with consequent worldwide distribution. This was followed by Pravastatin in 1991, Fluvastatin in 1994, Atorvastatin in 1997, Cerivastatinin 1998 and Rosuvastatin in 2003.(12)

Mechanism Of Action
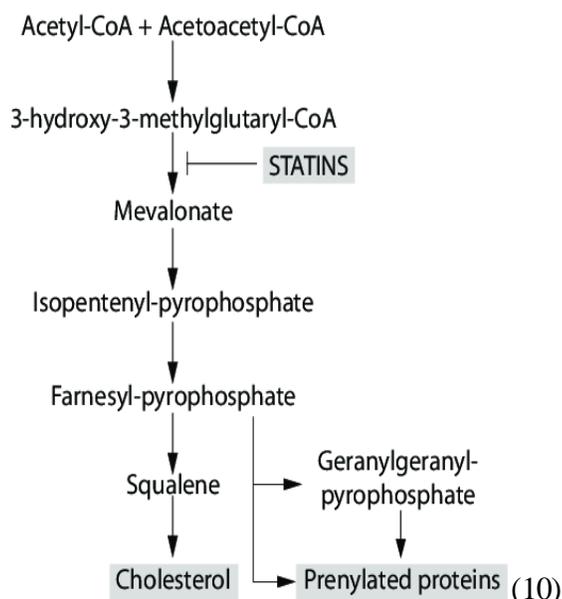
Statins have the capacity to reduce cholesterol biosynthesis mostly in liver; which has a role in its beneficial action. Statins have antiatherosclerotic effects that is correlated with decrease in LDL cholesterol. In addition, they can also exert atherosclerotic effect independently of their hypolipidemic action. Mevalonate metabolism generates a series if Isoprenoids for different cellular functions, from cholesterol synthesis to the control of cell growth and differentiation. (7)

Adverse Drug Reactions

Statins lower the serum low-density lipoprotein cholesterol and have a role in preventing cardiovascular events by inhibiting 3-hydroxy-3-methyl-glutaryl-CoA reductase. It was found that many patients ingesting statins suffered from skeletal muscle-associated symptoms. Statin-associated muscular symptoms include fatigue, weakness and pain, possibly accompanied by elevated serum creatine kinase activity. The most severe muscular adverse reaction is the potentially fatal rhabdomyolysis (8).

Safety and ADRs of statins are of special concern in patients affected by multiple chronic conditions requiring concomitant therapies at risk of Drug interactions, such as the elderly.(11)

Currently Available Agents

Atorvastatin: 10 to 80 mg by mouth daily

Fluvastatin　　: 20 to 80 mg by mouth in one to two doses

Lovastatin　　 :　10 to 80 mg by mouth in the evening

Pitavastatin　 : 1 to 4 mg by mouth daily

Pravastatin　　: 10 to 80 mg by mouth daily

Rosuvastatin　: 5 to 40 mg by mouth daily

Simvastatin　　: 5 to 80 mg by mouth in the evening (8).

Effect of Statin Therapy In Prevention Of Cardiovascular Disease And All-Cause Mortality In Elderly Patient

Elderly patients are the group of population who are least considered during the sub group analysis who are 85 years older and above(2). These subgroup will be presented with varying comorbid conditions which affect their quality of life. The ageing process gradually leads to organ dysfunction as well. The cardiovascular disease and its complications accelerates with the age. The preventive measures plays a mandatory role in reducing the unwanted health outcomes and complications related to it (1).

Statins are in usage since decades for the prevention of cardiovascular disease due to the deposition of atherosclerotic plaque and elevated LDL levels. Statins or 3-Hydroxymethyl gluataryl Coenzyme A reductase inhibitors inhibit HMGCoA Enzyme thereby reducing the serum

LDL-Cholesterol Level. Clinical studies are conducted to evaluate the efficacy of statins in prevention of cardiovascular disease and all-cause mortality .The Scandinavian Simvastatin Study was the first large scale study which revealed the association between statins and reduced major cardiovascular events, cardiovascular mortality and total mortality in patients with coronary artery disease and high blood

Cholesterol levels (5). Meta-analysis of large statin therapy revealed the reduced risk of cardiovascular events and related mortality in elderly patients who are on statin therapy. Systematic reviews pointed out that the use of statins is done based on individual baseline risk, and the greater advantage over reduction in cardiovascular events like stroke and less data available for the reduction in cardiovascular mortality.

Adverse events and drug interactions are seen in elderly population due to comorbidities and polypharmacy. Reduced risk of cardiovascular diseases are noticed in elderly patients continuing statins as primary prevention. It was identified that, patients who are older than 74 years old without Type2DM, statin treatment response in reduction of atherosclerotic CVD and all-cause mortality was poor whereas presence of type 2DM was associated with reduction in incidence of atherosclerotic CVD and all-cause mortality. But this effect was found to be reduced after the age of 85 years as per a study. After 74 years, natural death may occur. It need not be due to cardiovascular disease. Using statins, we may not be able to prevent deaths but can prevent CV events.

CONCLUSION

Statin usage in elderly patients is established since decades and there is a marked decline in the CV events and related complications. Noticeable reduction of atherosclerotic CVD events in patients who are older than 72 years with type 2 DM was observed. Further subgroup analysis are required to establish the relation between statin usage in CVD death and all-cause mortality.

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