The effect of Statins on outcome of Cerebral Ischemic Stroke

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ABSTRACT

Objective: Cerebral ischemic stroke (CIS) is common in elderly. Statins seem to be effective in decreasing the disability caused by CIS. The aim of study was to define the effect of statins on the short-term outcome of CIS.

Methodology: All CIS patients admitted in Shahid Beheshti Kashan Hospital confirmed by the clinical and paraclinical findings during 2010 were enrolled. Cases consisted of those using statins at least three months before the CIS, and controls did not use statins ever. Motor activity was measured based on Modified Rankin Scale (MRS). The MRS was compared at admission with the time of discharge from hospital. Poor outcome was defined if the motor condition would not change or become worse.

Results: Two hundred and thirty CIS patients (103 women) with mean age of 71.59 years were included. The numbers of patients with MRS score less than four was significantly higher in statin group than controls at the time of admission and also at discharge. (All P values < 0.001) The numbers of patients with poor outcome was significantly lower in statin group than controls. (P value < 0.001) The results were similar when the statin and control groups were adjusted for hypercholestrolemia.

Conclusion: Short-term outcome in patients taking statins before CIS was better than those who had never taken statins. It seems reasonable to recommend statin to lower motor disability and better outcome in patients with high risk for developing CIS.

KEY WORDS: Statins, Cerebral ischemic stroke, Modified Rankin Scale, Outcome.

INTRODUCTION

Cerebral ischemic stroke (CIS) is a syndrome characterized by the acute onset of a neurologic deficit that persists for at least 24 hours. It reflects focal ischemia of the central nervous system.[1-3]

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Stroke is the third most common cause of death in the United States and the most common disabling neurologic disorder. About 750,000 new strokes occur and about 150,000 people die from stroke in the United States each year.[1,3,4]

Risk factors for stroke include systolic or diastolic hypertension, hypercholesterolemia, cigarette smoking, heavy alcohol consumption, and oral contraceptive use.[1,3,4] Cerebral infarction comprises two pathophysiologic processes. One is a loss in the supply of oxygen and glucose secondary to vascular occlusion, and the other, is the changes in cellular metabolism resulting in the collapse of energy producing processes, ultimately leading to disintegration of cell membrane.[2,4]

Statins decrease synthesis of Low Density Lipoprotein (LDL) by inhibiting the 3-hydroxy-

Table-I: Comparison of statin users and control groups according to Modified Rankin Scale status (more or less than 4) at admission time.

	Modified Rankin Scale > 4	Modified Rankin Scale < 4	Total
Statin group	25	55	80
Control group	124	26	150
Total	149	81	230

Table-II: Comparison of statin users and control groups according to Modified Rankin Scale status (more or less than 4) at discharge time.

	Modified Rankin Scale > 4	Modified Rankin Scale < 4	Total
Statin group	10	70	80
Control group	107	43	150
Total	117	113	230

3-methylgluatryl coenzyme A (HMG-CoA) reductase. The benefit of LDL lowering by statins observed in many risk groups may depend not only on their effects on the lipid profile but also on direct modulation of plaque biology independent of lipid lowering.[3,4]

Several trials have confirmed that statins reduce the risk of stroke even in patients without elevated LDL or low High Density Lipoprotein (HDL).[2-10] Modified Rankin Scale (MRS) is a commonly used clinical outcome measure for evaluation of motor disability of patients who had a stroke.[5,9] The aim of study was to define the effect of statins on the short-term outcome of CIS.

METHODOLOGY

All patients referred to Kashan Shahid Beheshti Hospital for evaluation of stroke during the period of October 2009 to September 2010 were enrolled in the study. Those with history of Hypertension, Diabetes Mellitus, and Ischemic Heart Disease were excluded. After explaining the purpose of the study written consent was taken from the participants.

CIS was confirmed based on physical examination and observation of hypodense area in Brain CT scan. Patients with history of any amount of statin use during the past three months were considered as cases. Those without statin use were considered as controls. Case and controls were age and sex matched.

Motor ability was measured based on Modified Rankin Scale (MRS). The scale ranges from 0 to 6. Scale zero means perfect health, scale 4 means severe disability, and scale 6 means death. Good motor condition was defined if MRS was less than four. The MRS was compared at admission with the time of discharge from hospital. Poor outcome was defined if the motor condition (MRS Score) would not change or become worse.

Fasting serum Cholesterol was checked at admission. The values more than 200 mg/dl in women

and 220 mg/dl in men were considered as hyper cholesterolemia. Comparison of numbers of the patients in case and control groups was performed by chi-square test. Then the data was adjusted for hypercholesterolemia and reanalyzed by using Mann-Whitney test. Comparison of mean of the continuous variables was performed using t test.

RESULTS

A total of 230 patients (103 females, and 127 males) with mean age of 60 years were included. The mean MRS in statin group (2.7 ± 1.44) was significantly different compared with control group (4.28 ± 0.88) at admission, (P value < 0.001). The mean MRS in statin group (1.59 ± 1.58) was significantly different compared with control group (4.09 ± 1.25) at discharge time, (P value < 0.001).

There were significant difference between statin users and control groups according to MRS status (more or less than 4) at admission time and discharge (All P values < 0.001) that are shown in Tables-I and II. There was significant difference in short term prognosis between statin users and control groups (P value < 0.001) that is shown in Table-III.

DISCUSSION

In this study a total of 230 patients (103 females, and 127 males) with mean age of 60 years were included. There were significant difference between statin users and control groups according

Table-III: Comparison of short term prognosis between statin users and control groups.

	Good Prognosis	Poor Prognosis	Total
Statin group	67	13	80
Control group	43	107	150
Total	110	120	230

to MRS status (more or less than 4) at admission time and discharge (All P values < 0.001). There was significant difference in short term prognosis between statin users and control groups (P value < 0.001).

According to Reeves MJ et al[5] Statins reduce the risk of stroke in at-risk populations and may improve outcomes in patients taking statins before a cerebral ischemic stroke (CIS). After multivariable adjustment, pretreatment with statins was associated with lower odds of poor outcome (OR=0.74, 95% CI 0.52, 1.02). A significant interaction was found between statin use and race. In whites, statins were associated with statistically significantly lower odds of poor outcome (OR=0.61, 95% CI 0.42, 0.86), but in blacks statins were associated with a non-statistically significant increase in poor outcome (OR=1.82, 95% CI 0.98, 3.39).

Matched propensity score analyses were consistent with the multivariable model results. Pretreatment with statins was associated with better stroke outcomes in whites, but they found no evidence of a beneficial effect of statins in blacks. They suggested further studies, including randomized trials, to examine differential effects of statins on ischemic stroke outcomes among whites and blacks."[5] Joan Martí-Fabregas et al[6] suggested that Statins may be beneficial for patients with acute ischemic stroke. They hypothesized that patients pretreated with statins at the onset of stroke have less severe neurological effects and a better outcome. They included 167 patients (mean age 70.7±12 years, 94 men). Thirty patients (18%) were using statins when admitted.

Outcomes at three months were more frequent in the statin group (80% versus 61.3%, P=0.059 with the MRS; 76.7% versus 51.8%, P=0.015 with the BI). Statins may provide benefits for the long-term functional outcome when administered before the onset of cerebral ischemia. However, randomized controlled trials will be required to evaluate the validity of our results.[6] Lalouschek W et al suggested that Statins reduce the risk of myocardial infarction and stroke in patients with vascular disease.[7]

CONCLUSION

Short-term outcome in patients consuming statins before CIS was better than those who had never taken statins. It seems reasonable to recommend statin to lower motor disability and better outcome in patients with high risk for developing CIS.

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