The impact of statin therapy on long-term cardiovascular outcomes in an outpatient cardiology practice

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Abstract

Introduction: Statins reduce coronary events in patients with coronary artery disease.
Material and methods: Chart reviews were performed in 305 patients (217 men and 88 women, mean age 74 years) not treated with statins during the first year of being seen in an outpatient cardiology practice but subsequently treated with statins. Based on the starting date of statins use, the long-term outcomes of myocardial infarction (MI), percutaneous coronary intervention (PCI), and coronary artery bypass graft surgery (CABGs) before and after statin use were compared.
Results: Mean follow-up was 65 months before statins use and 66 months after statins use. Myocardial infarction occurred in 31 of 305 patients (10%) before statins, and in 13 of 305 patients (4%) after statins ($p < 0.01$). Percutaneous coronary intervention had been performed in 66 of 305 patients (22%) before statins and was performed in 41 of 305 patients (13%) after statins ($p < 0.01$). Coronary artery bypass graft surgery had been performed in 56 of 305 patients (18%) before statins and in 20 of 305 patients (7%) after statins ($p < 0.001$). Stepwise logistic regression showed statins use was an independent risk factor for MI (odds ratio = 0.0207, 95% CI, 0.0082-0.0522, $p < 0.0001$), PCI (odds ratio = 0.0109, 95% CI, 0.0038-0.0315, $p < 0.0001$) and CABGs (odds ratio = 0.0177, 95% CI = 0.0072-0.0431, $p < 0.0001$)
Conclusions: Statins use in an outpatient cardiology practice reduces the incidence of MI, PCI, and CABGs.

Key words: statins, myocardial infarction, coronary revascularization.

Introduction

Numerous studies have demonstrated that statins reduce the incidence of coronary events in patients at high risk for coronary events [1-8]. The efficacy of statins in reducing coronary events in an outpatient cardiology practice needed to be investigated. This article reports data comparing the incidence of new myocardial infarction (MI), of new percutaneous coronary intervention (PCI), and of new coronary artery bypass graft surgery (CABGs) in 305 patients, mean age 74 years (93% with coronary artery disease), treated in an academic community cardiology practice during the

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time they were not treated with statins vs. during the time they were subsequently treated with statins.

Material and methods

Paper and electronics chart reviews were used to screen patients treated with statins at an academic community cardiology practice from 1978 to 2008. Based on the starting date of statin use, long-term clinical outcomes before and after statins start dates were calculated and compared. Patients who were treated with statins within the first year of follow-up were excluded from the study in order to achieve comparable duration of follow-up. Out of 1, 599 patients screened at the practice [9], 305 patients met all criteria and were included in the study.

For every patient, progress notes of all interim visits, letters of correspondence, medication use, blood pressure, laboratory studies including serum lipid levels, and occurrence of adverse cardiovascular events from the time of initial presentation to the last follow-up were recorded. Adverse events included occurrence of MI, need for PCI, and need for CABGs. Drug therapy and patient comorbidities including coronary artery disease, hyperlipidemia, hypertension, diabetes mellitus, cigarette smoking history,

Table I. Baseline characteristics of 305 patients

Age [years]	74 ±10
Men	217
Women	88
Follow-up before statin use [months]	65
Follow-up after statin use [months]	64
Coronary artery disease	283 (93%)
Hyperlipidemia	270 (89%)
Hypertension	251 (82%)
Diabetes mellitus	76 (25%)
Congestive heart failure	49 (16%)
Angina pectoris	35 (11%)
Atrial fibrillation	54 (18%)
Carotid artery stenosis	18 (6%)
Stroke	30 (10%)
Transient ischemic attack	18 (6%)
Chronic renal disease	8 (3%)
Peripheral arterial disease	35 (11%)
Abdominal aortic aneurysm	12 (4%)
Smoker	130 (43%)
Prior myocardial infarction	102 (33%)
Prior percutaneous coronary intervention	49 (16%)
Prior coronary artery bypass graft surgery	49 (16%)

congestive heart failure, angina, atrial fibrillation, chronic kidney disease, peripheral arterial disease, abdominal aortic aneurysm, carotid artery stenosis, transient ischemic attack, stroke, and previous MI, PCI, and CABGS were recorded. Dates of the events as well as dates of medication initiation and discontinuation were recorded. Coronary artery disease was diagnosed as previously described [10-16].

Data were extracted by the physician authors and tabulated with Microsoft Access 2003 (Microsoft Corporation, Redmond, WA, USA). Customized computer programming was written for macros within Microsoft Excel 2003. The McNemar test was used to compare clinical outcomes. Adverse events occurring before the time of initial presentation were not included in the outcomes analysis. Stepwise logistic regression was performed with MEDCAL statistical software using the 48 variables listed in Tables I and II to determine if use of statins was independently associated with MI, PCI, and CABGS. A two-sided p value of < 0.05 was considered significant.

Results

Table I shows the baseline characteristics of the 305 patients. Table II shows the prevalence of use of drugs in the 305 patients before, after, and before and after use of statins. Table III shows the mean blood pressure and serum lipids levels before and after use of statins. Table III also shows levels of statistical significance. Table IV shows the incidence of MI, of PCI, and of CABGs before and after treatment with statins. Table III also shows levels of statistical significance.

Stepwise logistic regression analysis showed that use of statins was a significant independent predictor of new MI (odds ratio = 0.0207; 95% CI 0.0082-0.0522; p < 0.0001), of new PCI (odds ratio = 0.0109; 95% CI 0.0038-0.0315; p < 0.0001) and of new CABGs (odds ratio = 0.0177; 95% CI 0.0072-0.0431; p < 0.0001).

Discussion

Numerous studies have demonstrated that statins reduce the incidence of coronary events in patients at high risk for coronary events [1-8]. The present study compared the incidence of new MI, of new PCI, and of new CABGs in 305 patients, mean age 74 years (93% with coronary artery disease), treated in an academic community cardiology practice during the time they were not treated with statins versus during the time they were subsequently treated with statins.

At 65-month follow-up before treatment with statins and at 64-month follow-up after treatment with statins, the incidence of new MI was significantly reduced from 10% to 4% by statins (p < 0.01),

Table II. Drug therapy in 305 patients

Medications	Number (%)	Mean duration of therapy [years]
Statins	305 (100)	5.36
Ezetimibe	78 (26)	2.12
Niacin	26 (9)	2.49
Bile acid sequestrants	7 (2)	1.12
Fibrates	34 (11)	3.42
Fish oils	14 (5)	1.94
β-Blockers	260 (85)	8.06
Diuretics	180 (59)	5.72
Angiotensin-converting enzyme inhibitors	225 (74)	5.38
Angiotensin receptor blockers	102 (33)	3.76
Calcium channel blockers	187 (61)	6.29
Other antihypertensives	32 (10)	4.73
Aspirin	270 (89)	8.41
Ticlopidine	10 (3)	3.18
Clopidogrel	82 (27)	2.19
Aspirin/ extended-release dipyridamole	2 (1)	3.34
Other antiplatelet drugs	6 (2)	2.90
Warfarin	100 (33)	4.90
Nitrates	116 (38)	5.26
Digoxin	70 (23)	5.34
Cilostazol	3 (1)	2.65
Insulin	24 (8)	8.60
Thiazolidinediones	35 (11)	3.08
Sulfonylureas	47 (15)	5.37
Metformin	38 (12)	4.55
Sitagliptin	2 (1)	0.64

Table III. Blood pressure and serum lipid levels before and after statin therapy

Variable	Before statins	After statins	Value of p
Systolic blood pressure [mmHg]	134 ±14	130 ±13	< 0.01
Diastolic blood pressure [mmHg]	78 ±8	73 ±7	< 0.001
Mean arterial pressure [mmHg]	97 ±9	92 ±8	< 0.001
Total cholesterol	195 ±43	157 ±32	< 0.001
LDL cholesterol [mg/dl]	118 ±38	80 ±22	< 0.001
HDL cholesterol [mg/dl]	45 ±13	49 ±15	< 0.01
Triglycerides [mg/dl]	168 ±96	147 ±82	< 0.05

LDL – low-density lipoprotein, HDL – high-density lipoprotein

Table IV. Incidence of myocardial infarction and coronary revascularization before and after use of statins

	Before statins	After statins	Value of p
Myocardial infarction	31 (10%)	13 (4%)	< 0.01
Percutaneous coronary intervention	66 (22%)	41 (13%)	< 0.01
Coronary artery bypass graft surgery	56 (18%)	20 (7%)	< 0.001

the incidence of new PCI was significantly reduced from 22% to 13% by statins (p < 0.01), and the incidence of new CABGs was significantly reduced from 18% to 7% by statins (p < 0.001). Stepwise logistic regression analysis using 48 variables showed that use of statins was a significant independent risk factor for reducing new MI, new PCI and new CABGs (p < 0.0001).

Our data show that use of statins in patients with overt coronary artery disease (93%) or at high-risk for coronary artery disease in a community cardiology practice can reduce their chance of developing new MI, new PCI and new CABGs. This study should give community practitioners, both specialists and primary care providers, the encouragement to pursue cardiovascular risk reduction strategies as a means for reducing new MI, PCI and CABGs in their patients.

A limitation of this study is that it is a retrospective chart analysis study with all inherent problems of such a design.

Acknowledgments

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