



Patterns of statin use and cholesterol goal attainment in a high-risk cardiovascular population: A retrospective study of primary care electronic medical records

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KEYWORDS:

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Cardiovascular risk;
Primary care;
LDL cholesterol;
Electronic medical records

OBJECTIVE: To describe real-life patterns of statin use and cholesterol goal attainment in a retrospective cohort of patients with high cardiovascular risk.

METHODS: Retrospective cohort study of 21,636 individuals, 18.34% women, mean age 63.30 years (standard deviation 6.29). New statin users aged 35 to 74 years at high cardiovascular risk and with no previous cardiovascular disease in primary care electronic medical records (2006–2011). Patterns of statin use were based on statin type, potency, and 1-year statin switches.

OUTCOMES: Relative mean reductions over 1 year and probability of goal attainment (<3.3 mmol/L). Natural patterns of statin use were identified using multiple correspondence analysis; general linear and logistic models were used to estimate low-density lipoprotein cholesterol (LDL-C) reductions and goal attainment probability.

RESULTS: Three patterns of statin use were defined: low (3.82% of the population), moderate (71.94%), and high intensity (24.24%). After 1 year, potency decreased 42.74%, 64.16%, and 50.94%, respectively, and 37.41%, 29.47%, and 30.16% of the population stopped taking statins in low, moderate, and high patterns, respectively. Relative reductions in LDL-C: low intensity, 15.7% (95% confidence interval [CI]: –22.96 to 54.36); moderate intensity, 29.72% (95% CI: 29.12–30.32); and high intensity, 24.20% (95% CI: –8.08 to 40.32). There was a direct relationship between higher intensity patterns and greater probability of goal attainment.

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CONCLUSIONS: Three real-life patterns of statin use were identified. Lipid management strategies in primary care should focus on improving adherence to treatment. People starting at low potency should switch to a moderate pattern; more intensive therapies should be considered in who require a larger LDL-C reduction to reach therapeutic targets, patients with good treatment adherence who do not achieve the goal with a moderate pattern of therapy or patients at very high risk.

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Introduction

Statin effectiveness in reducing low-density lipoprotein cholesterol (LDL-C) levels is well known in high-risk populations and secondary prevention.^{1,2} It is estimated that 1-mmol/L reduction in LDL-C may reduce 5-year incidence of cardiovascular events and coronary revascularization by one fifth,¹ and a similar effect has been observed in a comparison of intensive and less-intensive statin regimens.^{3,4} In addition, a study by Cholesterol Treatment Trialists' Collaboration showed that a 1-mmol/L reduction in LDL-C safely reduces 5-year incidence of cardiovascular events and coronary revascularization in low-risk populations by 10%, regardless of age, gender, and baseline LDL-C.⁵

The recommended management of patients with dyslipidemia, including the patterns of statin use to achieve recommended thresholds, differs substantially between the European Society of Cardiology/European Atherosclerosis Society⁶ and the American College of Cardiology/American Heart Association.⁷ In both the cases, however, recommended patterns of statin use are based on their capacity to lower baseline LDL-C levels.

Despite these guidelines,^{6,7} observational studies show that the recommended goals are not being achieved in primary prevention populations, community settings,^{8–11} or secondary prevention.^{12,13} These results may be partly related to the real-life patterns of statin use.^{14–16} Patterns of statin use have been studied in specific populations, such as diabetics, and in secondary prevention,^{12,13} but real-life studies in primary prevention and other high-risk populations are scarce.¹⁷ Further description of these patterns may help to improve the management of these populations and attainment of the recommended goals.

The aim of the present study of primary care electronic medical records was to describe real-life patterns of statin use and cholesterol goal attainment in a retrospective cohort of patients with high cardiovascular risk and no history of cardiovascular disease.

Methods

Design

Retrospective cohort study.

Data source

The Information System for the Development of Research in Primary Care (SIDIAP) is a clinical database

of anonymized longitudinal patient records for nearly 6 million people (80% of the Catalan population and 10.2% of the total population of Spain) registered in 274 primary care practices having a total of 3414 general practitioners (GPs).¹⁸ A subset of records from GPs who surpass predefined data quality standards¹⁹ constitutes the SIDIAP^Q, which provides research-quality anonymized data on approximately 2 million patients. The information recorded includes demographic and lifestyle factors relevant to primary care settings (body mass index [BMI], smoking status, alcohol use, and so forth); clinical diagnoses, outcomes, and events (coded according to the International Classification of Diseases, 10th revision); referrals and laboratory tests; and prescribed medications actually dispensed by community pharmacies. The quality of SIDIAP data has been previously documented, and the database has been widely used to study the epidemiology of a number of health outcomes.^{20–23}

Study population and inclusion criteria

All new statin users aged 35 to 74 years, at high cardiovascular risk and without previous history of cardiovascular disease (symptomatic peripheral arterial disease, coronary heart disease, stroke, or revascularization procedures) as recorded in SIDIAP^Q between July 2006 and December 2010 were eligible for inclusion.

Coronary heart disease risk was calculated using the Framingham function adapted and validated in the Spanish population by the Registre Gironí del Cor study²⁴ and the systematic coronary risk evaluation function.²⁵ High cardiovascular risk was defined as Registre Gironí del Cor 10-year risk $\geq 10\%$ or systematic coronary risk evaluation $\geq 5\%$.

Study entry and follow-up

Study period was from July 2006 through December 2011, with enrollment from July 2006 to December 2010. Patients were censored at the date of death, transfer from SIDIAP^Q, or the end of the study period (31 December 2011).

Statin exposure

To prevent survivor bias and covariate measurement bias, a “new users design” was selected over “all statin users”. New users were defined as receiving statins for the

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