THE RESULTS OF DIETARY ADVICE ON LIPOPROTEIN LEVELS AMONG PATIENTS ATTENDING FOR LIPID-LOWERING DRUGS

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SUMMARY

The aim of this study was to evaluate the changes in fasting lipoproteins levels before and after a dietary advice among the patients attending for a lipid-lowering treatment.

In total 286 patients attending for reimbursement of a lipid-lowering drug were recorded at two regional health insurance offices. Lipid levels measured at least three months after the dietary advice were compared with those before the dietary advice.

The mean age of the included patients was 61 years. The average fasting total cholesterol (TC) was 7.4 mmol/l before the dietary advice as well as after the dietary advice. Fasting TC did not decrease with the dietary advice in 51% of the included patients. In the logistic regression not one of the studied factors was correlated with a successful dietary advice.

Half of the patients receiving lipid-lowering drugs in Belgium were not able to decrease their TC with dietary advice before the initiation of the treatment.

Key words: diet, dietary advice, cholesterol, Belgium, treatment guidelines, lipid-lowering treatment

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INTRODUCTION

According to the majority of the treatment guidelines, including the Adult Treatment Panel III guidelines (1), the European guidelines (2) and the European risk estimations (3) the major features of a lipid-lowering therapy should consist of therapeutic lifestyle changes including a reduced intake of cholesterol-raising nutrients, weight reduction and an increased physical activity.

In most double blind randomised clinical trials dietary measures can reduce TC and TG significantly. However, the effect of dietary advice by physicians in daily life conditions is less hope-giving (4, 5). The success of therapeutic lifestyle changes concerning diet, physical activity and weight loss are strongly associated with the physician's skills to give good advice on the motivation and compliance of the patient.

The aim of this study was to evaluate the changes in fasting lipoproteins levels before and after a dietary advice among the patients attending for a lipid-lowering drug. Additionally, the parameters influencing the success of the dietary advice were analysed.

MATERIAL AND METHODS

Data Collections and Study Population

During February and March of 2002 all first requests for the reimbursement of lipid-lowering drugs were recorded at the regional offices of two Health Insurance Associations (Liberale Mutualiteit Brabant and Vlaams Neutraal Ziekenfonds Aalst).

Belgian patients who requested the reimbursement for a cholesterol-lowering drug had to send a request to their local health insurance office. In secondary prevention as well as in primary prevention lipid-lowering drugs were reimbursed by the National Health Insurance (RIZIV = Rijksinstituut voor Ziekte- en Invaliditeitsverzekering) when after a hypolipemic diet of at least three months total cholesterol (TC) remained higher than 6.5 mmol/l or triacylglycerols (TG) remained higher than 2.3 mmol/l. Low-density lipoprotein cholesterol (LDL-C) was only taken into account for the reimbursement when it remained higher than 4.1 mmol/l in secondary prevention. In total contrast to most of the guidelines only fibrates and not statins were reimbursed for these patients. These reimbursement criteria were adapted in December 2003. Data collection for this study was based on a review of the accepted requests for reimbursement.

The following data were mandatory on the standard request forms: the name of the patient, fasting TC before and after a hypolipemic diet of at least three months and the date of both blood tests. Eventually fasting TG, high-density lipoprotein cholesterol (HDL-C) and low-density lipoprotein cholesterol (LDL-C) before and after the hypolipemic diet were mentioned on the form. Unfortunately no data about cardiovascular risk factors such as personal or family history, hypertension, diabetes, smoking habits, drug therapy and body mass index were available on the request form. Only for the few patients with familial hypercholesterolemia such data were provided. For this reason, our study population

contains patients in both primary and secondary prevention. The requests were done by general practitioners (GPs) as well as by specialists. Date of birth and gender were searched for in the records of the health insurance.

TC, LDL-C, HDL-C and TG were measured by local laboratories, no central laboratory was used. The local laboratory's performances are regularly subjected to internal as well as external quality control according to the Belgian guidelines for clinical biology. LDL-C levels were always calculated with the Friedewald formula, unless TG were above 3,4 mmol/l (6). In that case LDL-C levels were measured.

Statistical Analysis

SPSS-PC 11® (SPSS Inc.,Chicago,IL,USA) was used for analysis and statistical processing. Significant differences between continuous variables were detected with the independent-samples t-test. The cross-tables were used to detect differences between groups by means of χ^2 tests. Multivariate analyses were performed with forward stepwise logistic regression.

RESULTS

Characteristics of the Study Population

In total 286 patients (57% women) for whom a lipid-lowering drug regimen was initiated were recorded. Ten percent were treated by specialists and 90% by GPs. The mean age at the initiation of the treatment was 61 years (SD=12). The mean age was lower for men (58 years; SD=13) than for women (63 years; SD=11) ($p<0.001$). The age distribution for both genders at the initiation of the lipid-lowering treatment is displayed in fig. 1. Most of the patients (56%) were aged between 50 and 69 years at the initiation of the treatment. Men were over-represented in the younger age groups while women were over-represented in the older age groups.

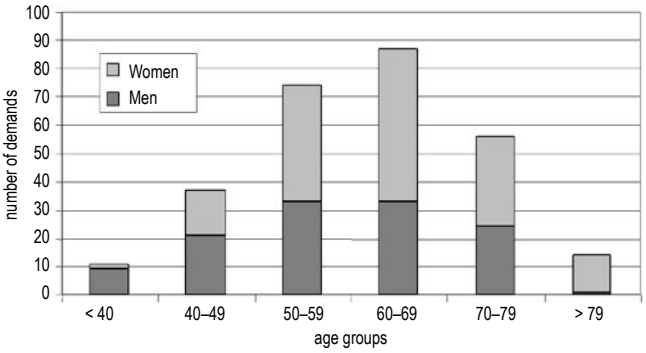

Fig. 1. *Age distribution for the new demands.*

Evaluation of the Dietary Advice

Mean fasting TC was 7.4 mmol/l (SD=0.9) before the dietary advice as well as after the dietary advice. Lipoproteins before and after the dietary advice are displayed in Table 1 for both genders. None of the changes are significant. Fasting TC did not decrease with the dietary advice in 51% of the patients who received an authorization for a lipid-lowering therapy (50% of men and 52% of women). Fasting TG did not decrease in 54% of the patients.

The mean interval between the blood tests was 44 weeks (SD=103). The time between both blood tests was longer for men (54 weeks; SD=147) than for women (37 weeks; SD=47) ($p<0.001$). The evolution of the lipoprotein levels was much better among the patients with a short interval between both blood tests (26 weeks or less) than for patients with a long interval between both tests (more than 26 weeks) (Table 2). Fasting HDL-C and TG improved for the patients with a short interval between both tests with respectively 11% ($p<0.001$) and 7% ($p<0.05$). Lipoproteins did not improve significantly for the patients with a long interval between both tests.

Factors Influencing the Success of the Dietary Advice

The correlation between a successful dietary advice and independent factors such as age, gender, initial lipid levels, interval between the initiation of the dietary advice and the monitoring blood test and specialty of the physicians were studied in a forward stepwise logistic regression. None of the studied factors were retained in the equation.

DISCUSSION

About 50% of the patients attending for a lipid-lowering drug were not able to decrease their TC or TG with a dietary advice. The other 50% could decrease their TC or TG with a dietary advice. We have serious doubt about the diet of those who were

Table 1. *Influence of dietary advice on the mean (SD) lipoprotein levels in mmol/l for both genders*

	Men (n=122)		Women (n=162)	
	Before diet	After diet	Before diet	After diet
TC	7.3 (0.9)	7.4 (1.5)	7.4 (0.9)	7.4 (0.9)
HDL-C	1.4 (0.4)	1.4 (0.4)	1.6 (0.5)	1.7 (0.5)
LDL-C	4.8 (1.1)	4.8 (1.3)	4.7 (1.0)	4.8 (1.0)
TG	2.6 (1.7)	2.8 (1.6)	2.4 (1.8)	2.1 (1.3)

TC = Total Cholesterol, HDL-C = High-Density Lipoprotein Cholesterol, LDL-C = Low-Density Lipoprotein Cholesterol, TG = Triacylglycerols

Table 2. *Influence of the interval between the blood tests on the evolution of the mean (SD) lipoprotein levels in mmol/l*

	Short interval (n=164) (26 weeks or less)		Long interval (n=116) (more than 26 weeks)	
	Before diet	After diet	Before diet	After diet
TC	7.5 (1.0)	7.4 (0.9)	7.2 (0.8)	7.4 (1.6)
HDL-C	1.5 (0.3)	1.6 (0.4)	1.5 (0.6)	1.5 (0.6)
LDL-C	4.9 (0.9)	4.8 (1.0)	4.5 (1.2)	4.7 (1.3)
TG	2.4 (1.8)	2.3 (1.4)	2.6 (1.6)	2.6 (1.6)

TC = Total Cholesterol, HDL-C = High-Density Lipoprotein Cholesterol, LDL-C = Low-Density Lipoprotein Cholesterol, TG = Triacylglycerols

not able to decrease their TC or TG. For these we have to put in doubt the patients' adherence to dietary recommendations or the physicians' motivation or skills to advise an adequate lipid-lowering diet. Before the initiation of the diet it is important to determine the patients' willingness to initiate and adhere to dietary modifications (7). On the other hand there have been several relevant systematic reviews that minimize the effectiveness of behavioural interventions in reducing CHD risk (4, 5).

On the contrary to other studies, HDL-C levels do not decrease significantly with the diet.

According to our study the lipoprotein levels are better for patients for whom the period between both bloods test was 26 weeks or shorter. Perhaps the other patients did not follow the diet appropriately. The fact that the interval between the dietary advice and the monitoring blood test is longer could be a sign of low compliance or motivation to follow the dietary advices.

Taking these factors into account we have some questions about the reimbursement of lipid-lowering drugs for patients who are not willing or able to decrease their lipid levels with a dietary advice. On the other hand it would not be fair to refuse the treatment because the patient is not able to decrease his lipoprotein levels. Probably these patients will benefit most from lipid-lowering therapy. Similarly the reimbursement of all cardiovascular drugs could thus be refused to smokers or overweight patients because they are not able or willing to change their lifestyle habits.

Another important finding is that the age at which lipid-lowering drugs are initiated is quite high. This is in contrast to the benefits of lipid-lowering treatment initiated at an early age (8, 9). Especially among men an early treatment is beneficial. Among women the treatment is only beneficial after menopause.

The study was limited because we have no idea about the exact dietary advice given by the physician, nor about the patients compliance.

One of the major strengths of our study is that data were obtained retrospectively among family physicians as well as specialists. The physicians were unaware that the lipoprotein levels of their patients and the management of hypercholesterolemia during their daily work was used for an evaluation. They were evaluated on what they did in daily practice and not on what they theoretically should do according to the guidelines.

We can conclude that half of the patients receiving lipid-lowering drugs in our study were not able to decrease their TC with dietary advice before the initiation of the treatment. Efforts should be made to promote the skills among physicians to advice efficient diets to their patients or to refer these patients to dieticians. The differences between the results of patients attending for their monitoring blood test after a short or after a long-term period are at least astonishing. Hereby we put the long-term benefits of a dietary advice in doubt when it is not supported by a continuous follow-up by physicians or dieticians.

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