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Role of Triglycerides and HDL for Residual Risk in Patients with LDL Cholesterol at Goal

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Abstract

Aim: To determine whether high triglycerides and/or low HDL-cholesterol in the presence of controlled LDL-cholesterol is related with cardiovascular disease and incident of coronary heart disease.

Methods: This study is a population-based case-control study with matching in gender and age; and was conducted in a university clinic. Cases had incident coronary heart disease, either acute myocardial infarction or acute coronary syndrome. Controls had diagnosis unrelated to coronary heart disease or other ischemic vascular disease. The cases and controls were patients who had LDL-cholesterol <130 mg/dL.

Results: Mean LDL-cholesterol was 91.25 mg/dL for cases and 99.30 mg/dL for controls. Statin treatment was used in 25.4% of cases and 22.3% in controls. The odds ratio of coronary heart disease was strongly and significantly associated with triglycerides concentration: 1.19 (1.10-1.28) per 30 mg/dL; and inversely associated with HDL-cholesterol: 0.71 (0.65-0.83) per 7.5 mg/dL.

Conclusion: High triglycerides and low HDL-cholesterol contributes strongly and independently to coronary heart disease in patients having LDL-cholesterol levels below 100 mg/dL. So, his contribution to residual vascular risk must be avoided in patients with controlled LDL-cholesterol.

Introduction

LDL-cholesterol (LDLc) is the main target as lipid cardiovascular risk factor [1]. The target level for treatment of LDLc are <130 mg/dL for majority of patients with moderate risk for Coronary Heart Disease (CHD), <100 mg/dL for patients with high risk, and <70 mg/dL for very high risk patients or secondary prevention.

Triglycerides and HDLc are additional independent factors [2,3] and could be consider in different conditions as secondary objectives, particularly in patients with atherogenic dyslipidemia [4]. Specifically it is desirable to have triglycerides <150 mg/dL and HDLc >40 mg/dL for men and >50 mg/dL for women.

The combination of elevated triglycerides and low HDLc may further increase cardiovascular risk, and it is found a synergism between high triglycerides and low HDLc in the odds ratio for CHD [5,6].

We hypothesize that the high triglycerides and low HDLc are each associated with CHD events in those with LDLc at the goals [7,8].

The objective of this study was to determine whether elevated triglycerides or low HDLc are independently associated with incident coronary heart disease with LDL under 130 mg/dL.

Methods

The design of this study was a case-control. Was realized in a Spanish university hospital and approved by ethics committee.

Data were compiled from clinical records.

Cases are adult male and female patients, age >50 years, hospitalized with a first or subsequent CHD, with LDLc <130 mg/dL, treated or nor with statins. Cases were identified by one of the following discharge diagnoses: non-ST segment elevation myocardial infarction, ST segment elevation myocardial infarction, or coronary acute syndrome (including unstable angina).

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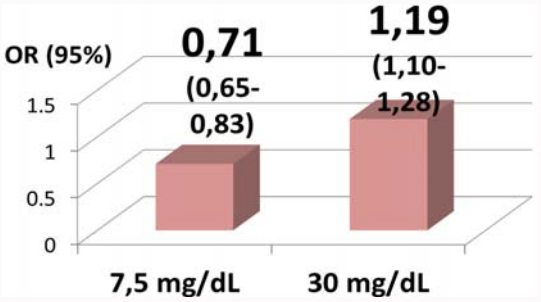

Figure 1: Cardiovascular risk (odds ratio) in patients with ischemic coronary disease and LDLc at goal according with magnitude of change in Tri Glycerides (TG) or HDLc (HDL).

Controls were patients free of previous CHD or acute events, age >50 years, hospitalized for other reasons, with LDLc <130 mg/dL, treated or not for elevated LDLc.

Cases and controls were studied for the following lipid parameters in the first available analysis: total cholesterol, LDLc, HDLc, and triglycerides.

Cases and controls were optimally matched based on age, gender and LDLc.

Results

Characteristics of the cases and controls are shown in Table 1. For the cases (N=138) compared with controls (N=157), men comprised 71% and 63%; mean age was 65 years and 62 years. Mean lipid concentrations for cases and controls were for LDLC: 91.25 mg/dL and 99.30 mg/dL; for HDLc: 40.79 mg/dL and 55.42 mg/dL; and triglycerides: 171.07 mg/dL and 140.31 mg/Dl.

Using linear scoring of triglycerides quintiles, the odds ratio for coronary event corresponding to a difference of one quintile (approximately 30 mg/ml was 11.19 (CI 5%: 1.10-1.28). For HDLc the odds ratio for one quintile difference (approximately 7.5 mg/dL) was 0.71 (CI 5%: 0.65-0.83) (Figure 1).

The odds ratios for one quintile difference of triglycerides or HDLc were similar for the different types of coronary event.

Discussion

Despite of controlled LDLc levels, coronary events were greater among patients with high levels of triglycerides or lower levels of HDLc, suggesting that persistent data of atherogenic dyslipidemia are associated with cardiovascular residual risk.

Post-hoc analysis of clinical trials concerning LDLc lowering suggests that triglycerides and HDLc levels are associated with cardiovascular disease and mortality, independent of other lipid fractions. The causal role of triglycerides in the development and progression of atherosclerotic cardiovascular disease are well known [9]; and there is evidence that even moderate triglyceride elevation is associated with cardiovascular risk among patients who have achieved LDLc control [6].

In a similar manner, low HDLc has shown in observational longitudinal studies the association with high risk for cardiovascular events, especially with levels under an umbra concentration and in patients with controlled LDLc [6,10].

So, according with the state of art, triglycerides and HDLc are two primordial markers to assess the residual risk, and independently associated with cardiovascular disease in general populations, even after adjustment for others variables [11].

These features are the basis to improve the diagnosis and management of atherogenic dyslipidemia, in particular in those patients with LDLc under control [12].

Table 1: Characteristics of cases and controls.

Group	Cases	Controls
N	138	157
Male (N-%)	98%-71%	99%-63%
Age (years)	65	62
Total cholesterol (mg/dL)	161,33	177,94
LDLc (mg/dL)	91,25	99,30
HDLc (mg/dL)	40,79	55,42
Triglycerides (mg/dL)	171,07	140,31
Statin (N - %)	35%-25.4%	45%-22.3%
Fibrate (N - %)	16%-11.6%	10-4.9%

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