NON-PHARMACOLOGICAL MEASURES TO IMPROVE HDL-CHOLESTEROL AND PLASMA TRIGLYCERIDE LEVELS

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Low HDL-cholesterol (HDL-C) and high plasma triglyceride (TG) are associated with high risk of cardiovascular (CV) diseases.

Abnormal HDL-C and plasma TG levels may be good "markers" of abnormal life style and/or various pathological conditions (Table 1). They may be normalized by a series of non pharmacological interventions, both in the general population and in individuals at risk for CV diseases, that will be briefly described in this article.

TABLE 1. Clinical and behavioural conditions associated with abnormal HDL and TG levels.

- Familial hypertriglyceridemia
- Nephrotic syndrome
- NID diabetes mellitus
- Obesity
- Abnormal food habits
- Sedentary life
- Sigarette smoking
- Total parenteral nutrition, beta-blockers, diuretics

WEIGHT LOSS

Weight loss, obtained either by diet alone or diet plus physical exercise, has been repeatedly shown to improve plasma lipid profile. Differences are however observed between acute and stable weight loss.

Acute weight loss.

In our experience (9), confirmed by others and recently by Vermeulen (20), acute weight loss obtained by total fasting, semistarvation or protein sparing modified fast, is characterized by a decline in plasma cholesterol and TG levels whilst HDL-C remains stable or slightly declines. These acute effects are probably the consequences of the reduction in dietary calories and lipids.

Stable weight loss.

Long term stable weight loss is associated with a decrement in plasma TG, a mild or no decrease in plasma cholesterol and a significant increase in

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HDL-C (3,21). These observations after stable weight loss remove the independent and additive effect of dietary composition and energy content, and support the influence of body weight loss, and fat mass reduction in particular, on plasma TG and HDL-C. These findings may be partially secondary to a reduction in insulin-resistance.

In conclusion, both acute and stable weight loss reduce plasma TG. The increase in HDL-C is a slower process to be obtained, being more sensible to the endocrine-metabolic adaptations to weight loss than to the composition of the hypocaloric diet.

PHYSICAL ACTIVITY

Several studies have shown that physical training increases HDL-C and, more consistently, decreases plasma TG. While some studies indicate that these effects are independent from the concomitant weight loss (16), others have related the effect of exercise to the losses of body weight (21). However, a direct evidence of an independent effect of physical exercise comes from Kiens and Lithell (8) who have observed, by measuring femoral arterio-venous differences, that trained muscle—in the resting condition—has a higher intake of VLDL-TG than non-trained muscle and, in addition, produces HDL-C. A production of HDL-C by the exercising forearm has been observed also by Ruys et al. (15). HDL-C release induced by exercise was enhanced after a fat meal, suggesting a related effect of exercise on the lipolysis of TG-rich particles and, respectively, the HDL formation.

No simple relationship has been consistently shown between changes in HDL-C and in plasma TG after physical activity. This could be due to the fact that different mechanisms are operative, depending on differences in type, duration and intensity of exercise. Clearer evidence of beneficial effects is observed after aerobic than after anaerobic exercise. Moreover, Annuzzi et al. (1) have shown that, even if plasma TG were decreased one day after a 90min exercise bout, a longer session was necessary to increase the removal of exogenous plasma TG, which may be the prerequisite of an increase in HDL-C. Furthermore, Stein et al. (17) have shown that a minimum training intensity equal to 75% maximal heart rate is required to increase HDL-C.

In conclusion, physical training is able to decrease plasma TG and, less often, to increase HDL-C. These changes seem to be independent from losses in body weight. To more consistently obtain these beneficial changes aerobic type of exercise of adequate duration and intensity is suggested.

SMOKING CESSATION

Cross-sectional studies have shown that current