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Serum cholesterol and impulsivity in a large sample of healthy young men☆

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Abstract

Studies that have investigated the association between cholesterol levels and impulsivity are relatively few in number and have yielded equivocal results. In this study, we investigated the relationship between impulsivity, depression and serum lipids [total cholesterol, high-density lipoprotein (HDL) cholesterol, and triglycerides] in a large sample ($N=2051$) of healthy young men who were remarkably homogeneous in terms of age, educational level, and socioeconomic conditions. Depression was assessed using the depression scale of the Minnesota Multiphasic Personality Inventory-2, and impulsivity was measured using the impulse control scale of the Big Five Questionnaire (BFQ). We found that subjects with a low serum cholesterol, defined as the lowest tenth of the total cholesterol distribution (≤ 3.7 mmol/l), scored significantly lower on the impulse control scale of the BFQ. There was no significant association between depression and cholesterol concentrations. In addition, in a multiple regression model, both lower levels of total cholesterol and higher levels of HDL cholesterol emerged as significant predictors of impulsivity. However, since the regression model accounted for only 0.6% of the variance in the score on the impulse control scale of the BFQ, the biological significance of these correlations was negligible. Taken together, these findings suggest that, in healthy young men, a relationship between cholesterol and impulsivity emerges only when the statistical analysis focuses on subjects with very low levels of cholesterol.

Keywords: Cholesterol; Impulsivity; Depression; Personality; Healthy men

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1. Introduction

Recent evidence has indicated a significant relation between low cholesterol levels and a variety of psychological and behavioral variables, including depression (Morgan et al., 1993; Brown et al., 1994; Steegmans et al., 2000; Troisi et al., 2001), anxiety (Suarez, 1999; Troisi et al., 2002), aggression (Golomb, 1998; Hillbrand and Spitz, 1999; Golomb et al., 2000), and suicidal behavior (Gallerini et al., 1995; Zureik et al., 1996; Papassotiropoulos et al., 1999). By comparison, studies that have examined the association between cholesterol levels and impulsivity are few in number and have yielded equivocal results.

In a sample of 152 adolescent psychiatric inpatients, Apter et al. (1999) found no correlation between total serum cholesterol and impulsivity. Using the Eysenck and Eysenck Impulsivity Questionnaire, Steegmans et al. (2000) found no differences between the scores of men with chronically low cholesterol levels ($\leq$4.5 mmol/l) and the scores of a reference group of men with cholesterol levels between 6 and 7 mmol/l. In a sample of 168 cocaine-dependent patients, Roy et al. (2001) found no significant correlations between total serum cholesterol levels and scores on the Barratt Impulsivity Scale. In contrast with the negative findings of these reports, other studies have found an inverse association between low cholesterol levels and impulsivity. Buydens-Branchey et al. (2000) found a moderate negative correlation ($r=-0.24$) between high-density lipoprotein (HDL) cholesterol and scores on the Barratt Impulsivity Scale in 38 personality-disordered cocaine addicts. New et al. (1999) found that patients with borderline personality disorder had significantly lower serum cholesterol levels than patients with other non-impulsive personality disorders. Garland et al. (2000) found a significant negative correlation between total serum cholesterol and self-reported scores of impulsivity in 100 consecutive patients who had attempted suicide.

Inconsistencies in the results of studies reported to date may reflect various limiting factors. For example, most of the evidence comes from studies of psychiatric patients with heterogeneous diagnoses. It is clear that in these clinical populations the presence of other symptoms, such as depression and hostility, can confound the relationship between cholesterol and impulsivity. A second limiting factor is the relatively small samples of previous studies, which were likely to include few individuals with naturally occurring low levels of cholesterol. Lastly, the majority of studies have examined the relation of impulsivity to total cholesterol only. Inclusion of additional measures, such as triglycerides and HDL cholesterol, may lead to a better determination of the degree to which impulsivity is associated with low lipid and lipoprotein concentrations.

In the present study, we investigated the relationship between impulsivity, depression and serum lipids (total cholesterol, HDL cholesterol, and triglycerides) in a large sample of healthy young men who were remarkably homogeneous in terms of age, educational level, and socioeconomic conditions.

2. Methods

2.1. Subjects

The original data base included a consecutive series of 3016 male volunteers in the Italian national recruitment for permanent duty in the 'Arma dei Carabinieri', during the period between March and June 1999. Mandatory requirements for application were a high school degree and demonstration of good social and legal conduct. All subjects underwent a complete physical examination, an endocrinological examination, a thorax X-ray, an electrocardiogram, and a complete blood and urine analysis, including a toxicological screening for drugs of abuse. During physical examination, subjects' body mass index (BMI) was recorded.

2.2. Biochemical determinations

Venous blood (15 ml) was taken from each subject at 07:30 h, after an overnight fast of at least 8 h, and divided into three samples for determination of hematology (Vacutainer with K3 EDTA), biochemistry and thyroid-stimulating hormone (TSH) (vacutainer with gel and clot activa-