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#### **Short Notes**

# Abnormal Lipid Profile as a Risk Factor for Suicide Attempt

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#### Abstract

**Background:** Accumulated research evidence suggests a link between dyslipidemia and suicidal behavior. The aim of this study was to estimate the gender characteristics of the lipid profile of parasuicidal individuals who made a suicide attempt in various ways (highly lethal and non-violent).

**Results:** The level of total cholesterol and LDL cholesterol in both groups of male parasuicides was lower than in the control group. The level of these indicators in the blood plasma of men who made a suicide attempt using highly lethal methods and who committed non-violent parasuicide was approximately the same. There were no statistically significant differences from the control in the level of these indicators in both groups of women who committed parasuicide.

**Conclusions:** These findings suggest that hypocholesterolemia is a biological marker of suicidal behavior in men.

## **INTRODUCTION**

Accumulated research evidence suggests a link between dyslipidemia and suicidal behavior [1-6]. A meta-analysis of studies on this issue showed that in patients with depression who have made a suicide attempt, the level of triglycerides, cholesterol, low-density lipoprotein (LDL), high-density lipoprotein (HDL) in blood plasma is lower than in depressed patients who have not committed parasuicide [7]. These data suggest that dyslipidemia, especially low cholesterol, is a risk factor for suicidal behavior. There is also evidence indicating that low cholesterol is associated with increased impulsivity and is a predictor of the likelihood of using highly lethal methods of parasuicide [8].

In some studies, the involvement of cholesterol in the etiology of suicidal behavior has been questioned. A retrospective analysis of 213 patients with affective disorders showed no difference in cholesterol levels between parasuicidal and nonparasuicidal patients [9]. Another study showed no differences in the lipid profile in depressed patients who had and did not commit suicide [5]. Moreover, it has been shown that the risk of a suicide attempt increases with an increase in plasma cholesterol levels [3]. Overall, the exact nature of the association between cholesterol levels and the risk of parasuicide remains unclear. Available research evidence on the gender characteristics of lipid metabolism in parasuicidal individuals are limited and contradictory [1-5].

In relation to this, the aim of present study was to estimate the gender characteristics of the lipid profile of parasuicidal

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#### **Keywords**

- Parasuicide
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- Gender

individuals who made a suicide attempt in various ways (highly lethal and non-violent).

## **MATERIALS AND METHODS**

The study involved 108 men and 58 women who made a suicide attempt. All study participants were divided into three groups. The first group included 39 men and 41 women who were examined after a suicide attempt using non-highly lethal methods of self-harm (NVLSS). The second group consisted of 37 men and 9 women who were examined after a suicide attempt using highly lethal methods of self-harm (HLSS). The comparison group (CG) consisted of 32 men and 8 women who were examined in connection with adjustment disorder after suffering stress, who did not make a suicidal attempt. In the blood plasma of all participants in the study, lipid metabolism indicators were determined: triglycerides (TG), total cholesterol (TC), cholesterol in the composition of low-density lipoproteins (C-LDL), cholesterol in the composition of high-density lipoproteins (C-HDL).

## RESULTS

The level of TC and LDL cholesterol in both groups of male parasuicides was lower than in the control group (Table 1). At the same time, the level of these indicators in the blood plasma of men who made a suicide attempt using highly lethal methods and those who committed non-violent parasuicide was approximately the same. Compared to controls, TG levels were only significantly lower in men who attempted suicide using non-lethal self-harm

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Table 1: Lipid profile indicators in men and women, mmol/l.						
	CG		NVLSS		HLSS	
	male	female	male	female	male	female
TG	1,61±0,1	1,05±0,02*	1,11±0,1	1,30±0,1	1,30±0,1	0,80±0,01*
ТС	4,57±0,2	4,70±0,3	3,54±0,2	4,10±0,3*	3,57±0,3	4,0±0,3*
C-LDL	2,79±0,1	2,74±0,2	1,96±0,2	2,30±0,2*	1,93±0,2	2,45±0,2*
C-HDL	1,05±0,03	1,10±0,1	1,09±0,1	1,21±0,1	1,05±0,1	1,18±0,1

techniques. The level of HDL cholesterol in all three groups was approximately the same.

The level of TC and LDL cholesterol in both groups of women who committed parasuicide was lower than in the control group, but these differences were not statistically significant (Table 1). The level of triglycerides in women who committed parasuicide using highly lethal methods was slightly lower than control values, while the level of this indicator in women who committed parasuicide by non-violent means was slightly higher than control, although these differences were not statistically significant. The level of HDL cholesterol in all three groups of women did not differ.

The gender specificity of the lipid profile was revealed in all groups. In the comparison group, the level of triglycerides is lower in women, while in all groups of parasuicides, the level of total cholesterol and LDL cholesterol in women is higher (Table 1).

## **DISCUSSION**

These findings are consistent with the results of previous studies showing lower cholesterol levels in parasuicidal subjects compared to non-suicide subjects. The data obtained support the hypothesis that low cholesterol is a risk factor for suicidal behavior [1-5].

Currently, the most recognized is the serotonin hypothesis, which explains the high risk of suicidal behavior in hypocholesterolemia [11]. As is known, insufficient activity of the central serotonergic system is associated with increased impulsivity, aggressiveness, and suicidal behavior [12]. Cholesterol is an important structural component of the neuronal membrane, which determines its fluidity, which affects the functioning of membrane-bound proteins, ion channels, and synaptic signal transmission [13]. Hypocholesterolemia increases membrane fluidity, which leads to a decrease in the binding of serotonin and G-protein to 5-HT1A receptors [14].

In present study, gender differences in the relationship between lipid profile and the risk of parasuicide were identified, indicating that hypocholesterolemia is a biological marker of suicidal behavior exclusively in men. However, given the relatively small size of the female sample, the identified gender specificity should be treated with a fair degree of caution.

The results of the present study did not support the notion that the plasma cholesterol levels of parasuicides who attempted suicide using highly lethal methods are lower than those of nonviolent parasuicides. Consequently, the serotonin hypothesis of the suicidal effect of hypocholesterolemia has not received indirect confirmation.

Proatherogenic (TG, LDL) and antiatherogenic (HDL) lipids may play different roles in the etiology of suicidal behavior. Segoviano-Mendoza et al found high triglyceride levels in depressed patients who attempted suicide [8], which contrasts with the results of another study in which the risk of parasuicide was associated with low triglyceride levels [6]. Our data suggest that low plasma triglycerides may be a risk factor for parasuicide in men.

It has previously been shown that both low and high LDL levels are associated with a high risk of parasuicide in depressed patients [3]. Our data suggest that low LDL cholesterol, as well as low total cholesterol, can be considered as a biological marker of suicidal behavior in men.

Data on the relationship between HDL levels and the risk of suicidal behavior are also conflicting. One study found no difference in HDL levels between suicidal and non-committed depressed patients [4], while in another study low HDL levels were associated with the risk of suicidal attempts in women [1]. In the present study, changes in HDL levels in parasuicidals of both sexes were not revealed, which indicates that this class of lipoproteins is not involved in the risk of suicidal behavior.

In conclusion, the results of the present study revealed lower levels of total cholesterol and LDL cholesterol in men who made a suicide attempt compared to those who did not commit a parasuicide. Specific features of the lipid profile in women who committed parasuicide were not identified. The data obtained give grounds to consider hypocholesterolemia as a biological marker of suicidal behavior in men.

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