

Short report

Cholesterol and mood states at 3 days after delivery

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Abstract

The aim of this study was to investigate the relationship between cholesterol and mood states in the initial puerperal period. The Profile of Mood States (POMS) was administered to 72 women on the third day after normal pregnancy, uncomplicated vaginal delivery and healthy baby. Plasma cholesterol

concentration was measured the same day. Our study indicates that reduced plasma cholesterol concentration is associated with major feelings of fatigue and depressed mood. The implications of these results are discussed. © 2002 Elsevier Science Inc. All rights reserved.

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Introduction

Over the last 10 years, many studies have highlighted the presence of a significant relationship between cholesterol and mood disorders. For instance, it has been suggested that low total serum cholesterol may be associated with low mood, and even lower cholesterol levels with an increased risk of suicidal behaviour [1–3].

Regarding pregnancy and the puerperal period specifically, we know that the total serum cholesterol concentration in women rises during pregnancy and then decreases after birth [4]. In particular, in the days following delivery, the decrease in serum cholesterol is associated with depressed mood [5]. These results have not been confirmed, however, by measures taken in the weeks after delivery [6] when the rapid serum cholesterol decline does not seem to increase the risk of postpartum depression.

In light of this debate, characterised by contradictory results, it seems important to verify if the total serum cholesterol concentration is associated with a depressed mood condition and/or other aspects of puerperal mood during the first days after birth, in a homogeneous sample of primipara women after a normal term pregnancy and vaginal delivery.

Method

We studied 72 healthy primigravida women, 25–35 years of age, with normal labour (mean length = 6 ± 1 h), normal delivery at term without pharmacological intervention and healthy child. The women were all married and had a medium-to-high socio-educational level as assessed by standard questions (years of education = 15 ± 3). None of the women was on cholesterol-lowering medications. Participation in the research was voluntary and all women gave their written consent.

On Day 3 postpartum (\bar{X} = 68 h), patients' mood was assessed at the Clinica Ostetrica of Padua University using the Profile of Mood States (POMS) [7,8]. Absolute serum cholesterol concentrations were measured the same day, using the Enzymatic colorimetric test [9], along with other chemical blood values that are regularly tested before discharge from hospital. These values were not analysed statistically as they were not linked to the hypotheses tested.

Results

Data were analysed using SPSS V 6.0 for Windows. Descriptive statistics were used to investigate serum cholesterol levels and POMS factor scores. An initial analysis of the data showed that subjects' scores for the single POMS factors are not distributed normally. Therefore, Spearman correlation

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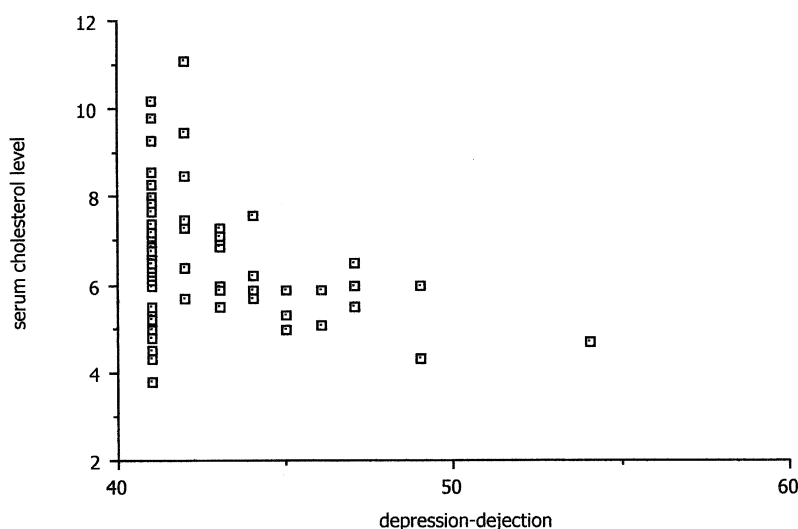


Fig. 1. Correlation between serum cholesterol level and depression–dejection scores (Spearman correlation: $n=72$, $\rho=-.27$, $P<.05$).

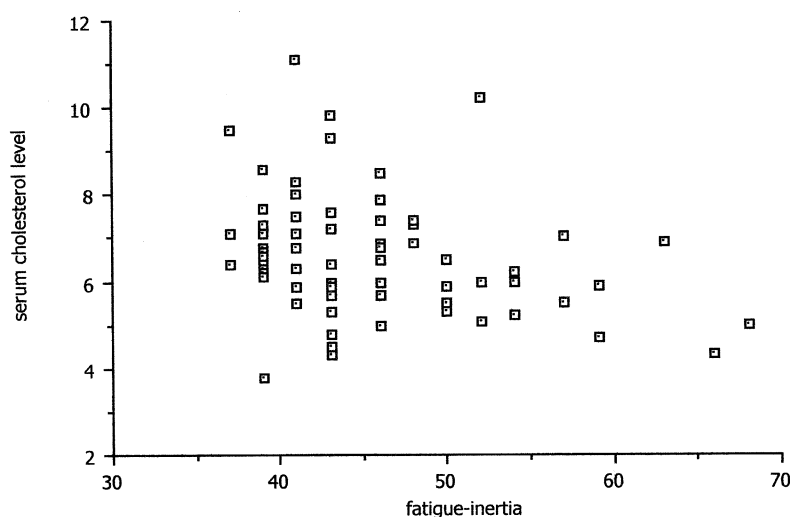


Fig. 2. Correlation between serum cholesterol level and fatigue–inertia scores (Spearman correlation: $n=72$, $\rho=-.30$, $P<.05$).

coefficient two-sided P values were sought between absolute lipid concentrations for each subject and mood scores obtained in each single factor of the POMS [(1) Tension–Anxiety; (2) Depression–Dejection; (3) Anger–Hostility; (4) Vigour–Activity; (5) Fatigue–Inertia; (6) Confusion–Bewilderment]. The results show a significant negative correlation

between serum cholesterol and depression–dejection ($\rho=-.27$; $P<.05$) (see Fig. 1), and fatigue–inertia ($\rho=-.30$; $P<.05$) (see Fig. 2). There are no significant correlations between serum cholesterol and the other factors. Table 1 shows the statistical scores obtained from the research sample for both cholesterol level and single POMS factors.

Table 1
Statistical values of serum cholesterol and POMS factors

	Mean	Median	Range	SD
Serum cholesterol	6.61	6.5	3.8–11.1	1.37
(1) Tension–Anxiety, 34–85 ^a	42.47	43	34–56	5.11
(2) Depression–Dejection, 41–95 ^a	42.43	44	41–54	2.45
(3) Anger–Hostility, 40–99 ^a	40.93	40	40–64	3.06
(4) Vigour–Activity, 26–75 ^a	51.78	53	27–75	10.64
(5) Fatigue–Inertia, 37–88 ^a	45.11	43	37–68	7.04
(6) Confusion–Bewilderment, 32–92 ^a	45	43	32–65	7.1

^a Minimum and maximum scores in the Italian version of POMS [8].

Discussion

This research shows a significant association between mood state and serum cholesterol level in the early postnatal period. The study also shows that after delivery, reduced serum cholesterol is associated with an increase in depressive symptoms, mainly feelings of discouragement, fatigue, numbness, diminished strength and vitality. A further qualitative analysis of the results obtained reveals that a large proportion of women (42 subjects: 58.3% of the research sample) scored 41 for the Depression–Dejection factor, a score which indicates the absence of depressed mood. These subjects, who therefore do not appear to suffer from depressed mood, present, however, cholesterol values between 3.8 and 10.2 (see Fig. 1). In other words, it is evident that some of these women contemporaneously present lowered serum cholesterol levels and limited depressive symptoms. The link between cholesterol and depressive state therefore seems to assume a contradictory nature in some subjects. This is difficult to interpret, above all with reference to the literature currently available on the subject. Further research is necessary for a greater understanding of the specificity of this phenomenon.

In short, the results of our study allow us to highlight the presence of a statistically significant correlation between cholesterol and certain aspects of mood states. In this regard, Ainiyet and Rybakowski [10] have postulated a connection between low cholesterol levels and lower activity of the central serotonergic structures responsible for inhibiting impulsive behaviour. Specific characteristics of such a link have not yet been widely studied. However, we do know that during moments of emotional distress, basal cholesterol levels increase by 20–30% [11] and that feelings ranging from satisfaction to distress accompany biological changes in metabolism, fat redistribution and weight that occur during the early postpartum months [12,13]. We believe that this knowledge could be extended to the measurement of plasma cholesterol levels and through a wide assessment of women's psychological condition during puerperium. This could be carried out by means of specific psychometric tools appropriate for assessing characteristics such as anxiety, depression, stress and psychological well-being. On the other hand, this knowledge could also be compared using the existing relationship between mood and abnormal or

extreme cholesterol levels. Finally, it seems important to correlate this information with further elements such as oral contraceptive use, breastfeeding, smoking, thyroid function and variations of body mass index over time. There is very little reference in the literature regarding the possible links among cholesterol, psychological conditions during puerperium and drug administration during labour and/or delivery.

These results would certainly help to clarify further studies on the existing link between plasma cholesterol levels and postnatal psychological condition. From this point of view, the systematic measurement of cholesterol in early puerperium could be a useful clinical tool for screening for postnatal depression, which so far has proved too difficult to prevent and diagnose.

References

- [1] Partonen T, Haukka J, Virtamo J, Taylor PR, Lönnqvist J. Association of low serum total cholesterol with major depression and suicide. *Br J Psychiatry* 1999;175:259–62.
- [2] Kunugi H, Takey N, Aoki H, Nanko S. Low serum cholesterol in suicide attempters. *Biol Psychiatry* 1997;41:196–200.
- [3] Golier JA, Marzuk PM, Leon AC, Weiner C, Tardiff K. Low serum cholesterol level and attempted suicide. *Am J Psychiatry* 1995;152:419–23.
- [4] Potter JM, Nestel PJ. The hyperlipidemia of pregnancy in normal and complicated pregnancies. *Am J Obstet Gynecol* 1979;133:165–70.
- [5] Ploekinger B, Dantendorfer K, Ulm M, Baischer W, Derfler K, Musalek M, Dadak C. Rapid decrease of serum cholesterol concentration and postpartum depression. *BMJ* 1996;313:664.
- [6] van Dam RM, Schuit AJ, Schouten EG, Vader HL, Pop VJM. Serum cholesterol decline and depression in the postpartum period. *J Psychosom Res* 1999;46:385–90.
- [7] McNair D, Lorr M, Droppleman L. Profile of Mood States manual. San Diego: Educational and Industrial Testing, 1981.
- [8] Farnè M, Sebellico A, Gnugnoli D, Corallo A, editors. POMS: Profile of Mood States. Firenze: Organizzazioni Speciali, 1991.
- [9] Warnick GR. Enzymatic methods for quantification of lipoprotein lipids. *Methods Enzymol* 1986;129:101–23.
- [10] Ainiyet J, Rybakowski J. Low concentration level of total serum cholesterol as a risk factor for suicidal and aggressive behavior. *Psychiatr Pol* 1996;30:499–509 (Abstract).
- [11] Pancheri P, Bressa M. *Ansia e dolore*. Latina, Rome: Wyeth, 1990.
- [12] Walker LO. Weight-related distress in the early months after childbirth. *West J Nurs Res* 1998;20:30–44.
- [13] Brewer MM, Bates MR, Vannoy LP. Postpartum changes in maternal weight and body fat depots in lactating vs. nonlactating women. *Am J Clin Nutr* 1989;49:259–65.