

# Cigarette Smoking And Lipids And Lipoproteins in Cord Plasma

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*The effects of smoking on maternal and cord plasma lipid and lipoprotein levels were measured in 20 smoker mothers and their newborns and compared to nonsmokers. Significantly higher levels of total cholesterol, low density lipoprotein cholesterol and very low density lipoprotein cholesterol and lower levels of high density lipoprotein cholesterol were found in smoker mothers and their newborns in comparison to nonsmokers. These results suggest that smoking does not effect only the lipids and lipoproteins of pregnant but also those of their fetuses. [Turk J Med Res 1993; 11 (4): 173-175]*

Key Words: Smoking, Lipids, Lipoproteins, Neonatal

Atherosclerotic heart disease is an important cause of morbidity and mortality in adults. There is some evidence that childhood levels of plasma lipids and lipoproteins are good predictors of levels in adulthood (1,2). Therefore, the pediatrician has to initiate screening of the high risk groups in early life.

An association between smoking and plasma lipid and lipoprotein concentrations have been shown in several studies (3,4). Since lipids and lipoproteins play an important role in pathogenesis of ischemic heart disease, early detection of their elevated levels may have a role in the prevention of this common disorder. The purpose of this study was to analyze the correlation between maternal smoking and cord lipid and lipoprotein levels.

## MATERIALS AND METHODS

A total 40 healthy full-term newborns and their mothers were screened for plasma lipids and lipoproteins in the Ondokuz Mayıs University Hospital. The participants were divided into two groups. First group included 20 nonsmoker mothers and their newborns and the second 2 included 20 smoker mothers and their newborns. The nonsmoker mothers smoked neither before nor during pregnancy and the smoker

mothers smoked at least one cigarette per day during pregnancy.

Blood samples were obtained immediately after delivery from the umbilical cord of the babies and peripheral veins of the mothers into test tubes containing 1 mg of EDTA per milliliter of blood. Total cholesterol (TC) and triglycerides (TG) were measured by enzyme colorimetric assay (Technicon RA-XT autoanalyzer).

High density lipoprotein cholesterol (HDL-C) was measured in the supernatant of heparin manganese precipitation of other plasma lipoproteins. Low-density (LDL-C) and very low density (VLDL-C) lipoproteins were calculated according to the formula of Friedewald et al (5). The students t-test was employed for statistical analysis.

## RESULTS

The characteristics of the mothers and newborns are shown in Table 1. In the group of newborns of smoker mothers, there are 8 females and 12 males. Their birth weights, gestational age and apgar score in one minute were 3668±776 g, 39±0.8 weeks, 8.8±0.8 respectively. In the group of newborns of nonsmoker mothers, there are 7 females and 13 males. Their birth weights, gestational age and apgar score in one minute were 3501±599 g, 40±1.2 weeks, 8.9±0.8 respectively. The differences between these values of two newborn groups were statistically not significant.

The difference between the levels of TC, HDL-C, LDL-C, and VLDL-C in cord plasma between smoker and nonsmoker groups were statistically significant

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Table 1. Some characteristics of the mothers and newborns

		Smoker	Non-smoker
M O T H E R S	Parity mean	1.3*0.8	1.6*1.1
	Gravidity mean	1.4*0.9	1.9*1.4
	Age in years	27±6	26.5±5.7
	Pregnancy weight (kg)	72±10	73.4±11
N E W B O R N S	Female	8	7
	Male	12	13
	Birth weight (kg)	3668±776	3501±599
	Gestation age (week)	39±0.8	40*1.2
	Apgar (1 minute)	8.8±0.8	8.9±0.8

Table 2. Plasma lipid and lipoprotein levels (mg/dl) in smoker and non-smoker groups.

Parameters:		TG	TC	HDL-C	LDL-C	VLDL-C
S M O K E R	Mothers n: 20	348±128	295±48 <sup>1</sup>	46±12 <sup>3</sup>	174±36 <sup>3</sup>	73±6 <sup>3</sup>
	Newborns n: 20	62±35	89±27 <sup>2</sup>	24±8.5 <sup>3</sup>	54±12 <sup>3</sup>	13±4 <sup>1</sup>
N O N S M O K E R	Mothers n: 20	297±90	265±58 <sup>1</sup>	56±11 <sup>3</sup>	129±45 <sup>3</sup>	79±4 <sup>3</sup>
	Newborns n: 20	68±26	73±23*	32±6.9 <sup>3</sup>	30±7 <sup>3</sup>	10±6.7 <sup>3</sup>
<sup>1</sup> P < 0,05 <sup>2</sup> P < 0,02 <sup>3</sup> P < 0,001						

(Table 2). These parameters were also different between the mothers. None of the mothers reported a family history of hyperlipidaemia or coronary heart disease.

The levels of TC, LDL-C and VLDL-C were higher ( $p < 0.02$ ,  $p < 0.001$ ,  $p < 0.05$ ) and HDL-C were lower ( $p < 0.001$ ) in umbilical cord plasma in newborns of smoker mother than in newborns of nonsmoker mother.

## DISCUSSION

Several studies have documented an association between cigarette smoking and altered plasma lipid and lipoprotein concentrations (3). Smoking has been found

to be associated with significantly higher plasma concentration of TG, TC and VLDL-C as well as lower plasma concentration of HDL-C (4).

Since nicotine crosses the placenta easily (6,7) it may affect the placenta and the fetus. Intrauterine growth retardation, increase in fetal heart rate, increase in cardiac output and peripheral vasoconstriction are some of the known effects of nicotine on the fetus (8). Some researchers have found a correlation between maternal and fetal cholesterol levels (9,10) but others showed no correlation (11,12).

In addition to smoking, other problems such as maternal hypertension, prolonged labour, meconium - stained amniotic fluid, a low Apgar score, fetal dis-

stress, and postterm deliveries have been shown to be related to changes in levels of triglycerides and cholesterol in the cord blood (13-16). Chronic maternal diseases such as diabetes mellitus may also increase cholesterol concentration in cord plasma (17).

Increased levels of lipids and lipoproteins may persist for years beyond the newborn period. Tsang et al, (18) Darmady et al, (19) and other authors have shown a positive correlation between cord fetal cholesterol and total cholesterol at 1 year of age. Lauer et al (1) showed a positive correlation between elevated levels of cholesterol during childhood and in adult life. They also showed that obesity oral contraceptive use, and cigarette smoking effect adult cholesterol levels and lipoprotein fractions. We plan to follow up the newborns for years to document the changes in plasma lipid and lipoprotein levels.

In conclusion we speculate that smoking pregnant women not only increase the risk of ischemic heart diseases for themselves but also for their children.

Sigara içinlerde kord plazmasında lipidler ve lipoproteinler

*Sigara içen 20 annede ve yeni doğan çocuklarında maternal ve kord plazma lipid ve lipoprotein düzeylerine sigaranın etkisi araştırıldı ve sigara içmeyenlerinki ile karşılaştırıldı. Sigara içen annelerde ve çocuklarında İçmeyenlere göre önemli derecede yüksek total kolesterol, düşük dansite lipoprotein kolesterol ve çok düşük dansite lipoprotein kolesterol ile biraz düşük yüksek dansite lipoprotein kolesterol bulundu. Bu sonuçlar sigara içmenin yalnız hamilelerde değil, fetüslerde de lipidleri ve lipoproteinleri etkilediğini gösterir. [Turk J Med Res 1993; 11(4): 173-175]*

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