SERUM CHOLESTEROL IN NEONATES AND THEIR MOTHERS A PILOT STUDY

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ABSTRACT

Reports from the Aga Khan University indicate that 58% of 400 school children studied had undesirably high serum cholesterol levels. The present study was undertaken to determine whether the high cholesterol levels are present at birth and to determine the relationship between cord blood, maternal blood cholesterol and maternal diet. Cord blood from 58 neonates and fasting venous blood form 45 mothers were analyzed for total serum cholesterol. Mothers were interviewed regarding their usual diet during pregnancy. Mean cord blood cholesterol was 56.90 mg/dl (range 26 to 123 mg/dI). Mean maternal blood cholesterol was 232.4mg/dl (range 141-382 mg/dl). Mean maternal intake of cholesterol was 457 mg (recommended level _ 300 mg/day). There was no significant co-relation between cord blood cholesterol and maternal blood cholesterol or maternal intake of cholesterol. Eighteen percent of the mothers reported a strong family history of hypercholesterolemia and/or heart disease, but this genetic tendency was not observed in the blood cholesterol level at birth indicating that environmental factors namely diet may have a prime role in determining serum cholesterol levels in childhood (JPMA 40:108, 1990).

INTRODUCTION

The prevalence of hypercholesterolemia in children and adults in Karachi has been reported to be high (unpublished data). An elevated cholesterol level is known to be a major risk factor for the development of coronary heart disease[1,2]. It has been shown that serum concentration of total cholesterol track rather well from childhood through to adult life[3,4]. Hereditary and dietary factors are known to influence the total cholesterol Ievels[5-7]. The present study was undertaken to determine whether Pakistani children start life with raised cholesterol levels, implicating heredity as the major factor responsible for the elevated cholesterol levels observed in school children. On the other hand if neonatal cholesterol values are within the normal range then this would indicate that environmental factors such as diet and activity play a more important role in determining the serum cholesterol levels of Pakistanis. Secondly, we wished to determine the correlation of maternal serum cholesterol levels and maternal cholesterol intake with neonatal serum cholesterol levels in order to assess the role of maternal diet on neonatal cholesterol levels.

MATERIALS AND METHODS

Cord blood was collected from 55 full term babies born at the Aga Khan University Hospital, Karachi during January toJuly 1989. Venous blood samples were collected from 45 mothers after a 12-hours overnight fast. Total cholesterol was determined by enzymatic methods[8] using an Astra autoanalyzer. Mothers were interviewed in detail about their usual diet during pregnancy using a food frequency questionnaire. The cholesterol intake per day was calculated using food composition tables[9]. The mean

neonatal serum cholesterol was 56.9 19.3 mg/dl with a range of 26 to 123 mg/dl. Two neonates had values above 115 mg/dl. The mean maternal serum cholesterol ranged from 141 to 382 mg/dl with a mean of 232.4 ± 48.9 mg/dl.

RESULTS

The mean daily maternal intake of cholesterol was 457 ± 209mg/day, ranging from 207 to 1089 mg/day. Milk, eggs, beef and mutton were the foods that contributed the most to the daily cholesterol intake.

TABLE. Mothers consuming high fat and/or high cholesterol foods daily.

Foods	Percent of Mothers consuming Daily
Milk	68%
Egg	62%
Beef/Mutton	53%
Biscuits, Cakes etc.	35%
Butter/Cream	32%

Table shows the percentage of mothers who ate these foods daily. One third of the mothers also ate cream/butter and biscuits/cakes daily. Most mothers reported an increase in their intake of milk, butter and eggs during pregnancy. There was no correlation between the neonatal cholesterol level and the maternal cholesterol level (r = 0.004) or the maternal cholesterol intake (r = 0.03).

DISCUSSION

The mean cholesterol levels of the Pakistani neonates in our study (56.9 mg/dl) was relatively low as compared to values reported for neonates from various other populations. It has been suggested that concentration of cholesterol above 115 mg/dl be considered abnormal[10]. It should be pointed out that two infants had values of 121 and 123 mg/dl. Okora et al[11] studied 55 Nigerian neonates and reported a mean cord cholesterol level of 104.8 mg/dl. American neonates have been reported to have a mean cholesterol level of 72 mg/dl[12]. Finnish newborns were first reported in 1973 to have a fairly high mean serum cholesterol level, 81.2 mg/dl[13]. Recent data suggests that mean level of serum cholesterol is declining in the Finnish population[14]. This decline is reflected in a 1985 report of 130 newborns whose serum cholesterol was 58.5 mg/dl[15]. This indicates that as a population is made aware of the need to decrease serum cholesterol levels, the change is reflected even in neonatal cholesterol levels. It is difficult to explain the relatively low neonatal cholesterol values in our study in view of the high incidence of hypercholesterolemia in children and adults in Karachi (unpublished data). However our neonate sample was small and more neonates are needed to be studied before we can draw any conclusions. The mean maternal cholesterol levels were relatively high (232 mg/dl). Desoye et al have reported that maternal cholesterol levels increase by about 65% by 38 weeks of gestation as compared

to total cholesterol values at 8 weeks of gestation[16]. There is a tendency for Pakistani women to increase their intake of cholesterol rich foods such as milk, eggs and butter during pregnancy. However, as shown by our study, there is no correlation between the mother's. diet during pregnancy and her neonate's cholesterol levels. Dietary restrictions during pregnancy to protect the neonate from having elevated cholesterol levels do not appear to be necessary. In conclusion the results of our study show that the neonates studied had relatively low cord blood cholesterol levels and that there was no correlation between neonatal cholesterol levels and either maternal cholesterol levels or maternal cholesterol intake.

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