Indian J Physiol Pharmacol 1995; 39(3): 287-289

SERUM LIPID PROFILE IN CHILDREN OF CORONARY HEART DISEASE PATIENTS

WAJID ALI*, AMIN BANDH AND MASOOD UL HASSAN

Department of Pediatrics,
Government Medical College
Srinagar - 190 001

(Received on July 22, 1994)

Abstract: Serum lipid and lipoprotein cholesterol levels were analysed in 44 children from 5-14 years of age (index), belonging to 29 parents diagnosed as coronary artery disease (CAD). 314 children of parents without any CAD served as control. Index group had significantly (P<.05) higher levels of total cholesterol (Tch), triglycerides (TG) and very low density lipo-proteins cholesterol (VLDLc) and low levels of high density lipoprotein cholesterol (HDLc) (P<.05). Index group revealed higher levels of cholesterol, triglycerides and low density lipoprotein cholesterol in 31.8%, 6.8% and 36% cases respectively. HDLc did not show any significant variation. Index group whose parents had hypercholestermia (Tch>260mg/dl) with CAD had raised levels of Tch, TG, LDLs and VLDLc when compared with control group (P<.05).

Key words: serum lipids, serum lipoprotein cholesterol, coronary atheresclerosis, hypercholestermia

INTRODUCTION

It has long been established that cholesterol (Tch) accumulates in the coronary wall and disorders of blood pressure are frequently associated with CAD in early adult life. Fatty streaks can be detected in infants by 3-5 months of age and increase in size and number during first two decades of life (1-5). Dyslipoproteinemia with elevated levels of Tch and LDLc and low levels of HDLc and family history of early CAD have been demonstrated as predisposing factors of early CAD (1-6). Recently more emphasis has been laid on the role of lipoproteins than cholesteraol alone (7-8). The present work is aimed at analysing major lipid and lipoprotein cholesterol spectrum in children with respect to CAD history of their parents with or without hypercholestermia in them.

METHODS

44 Children 5-14 years of age belonging to 29 parents diagnosed as CAD with the history of hospitalisation and documented CAD in the intensive cardiac care unit of SMHS Hospital Srinagar were taken up for the study (Index group) and were further divided into 2 groups. 31 children (group I) whose parents has simultaneous hypercholesteremia (Serum chotesterol >260 mg/dl) and 13 children (group 1a) whose parents had normal Tch levels (serum cholesterol <260 mg/dl). Age and sex matched group of normal healthy children from different schools and their normal parents constituted the control group.

Blood samples were obtained after overnight fast. Serum separated by centrifugation and stored in the refrigerator at 0.5°C. Lipid profile was estimated within 24 hours. Serum Tch and TG were analysed by a Spectrophotometric method (9-10). After precipitation of chylemicrons, VLDLc and LDLc, HDLc was separated and the estimation of HDLc was done by the method of Burstein et al (11).

LDLc and VLDLc were estimated by using Frieldwald formula (12).

VLDLc = TG/5
LDLc = Tch-(HDLc+TG/5)

*Corresponding Author and Present address : Department of Neonatal Pediatrics, S. K. Institute of Medical Sciences, Soura, P.O. Box No.27, G.P.O., Srinagar (Kashmir).

Statistical analysis was done by students' 't' test.

RESULTS

Mean serum levels of lipid and lipoprotein cholesterol in index and control groups are shown in Table I. Table II shows the lipid profile in children of parents with CAD with hypercholestermia. Although levels of Tch, TG, LDLc, VLDLc are raised in group I, but are not statistically significant (P>.05) when compared to control. Table III shows that 31.8%, 6.8% and 36% cases had higher levels of cholesterol, triglycerids and LDLc as compared to index group.

TABLE I : Lipid profile in children of CAD parents Vs/ normal

Lipid	*Group*	*Mean*	*S.D.*	*Range*	*P.Value*
Tch	I (n=44)	193.73	47.73	136-292	<0.05
	II (n=314)	172.8	15.19	138-248	
TG	I	72.72	16.07	50-136	<0.05
	II	66.46	12.64	30-92	
HDLc	I	69.27	9.14	52-86	<0.05
	II	71.22	13.22	32-110	
LDLc	I	109.91	42.97	49-198	<0.01
	II	88.88	22.90	44.4-177.2	
VLDLc	I	14.54	3.21	10-27.2	<0.05
	II	13.28	2.52	6-18.4	

TABLE III : Showing total percentage of hypercholestermia, hypertriglyceridemia and hyperlipoprotemia

Group	*No.*	*Hypercholostermia (Tch >100 mg/dl)*	*Hypertriglycerdemia TG >80 mg/dl*	*Hyperlioprotein cholesterol (LDLc) >90 mg/dl*
Index	44	14 (31.8)	3 (6.8)	16 (36.0)
Control	314	0	0	0
P Value		< 0.001	< 0.001	< 0.001

DISCUSSION

Study groups were thoroughly matched for age and sex and the groups did not differ with respect to either dietary pattern or body mass index. The obtained Lipoprotein cholesterol levels in subjects whose parents had CAD and had suffered myocardial infarction before 45 years, were not unexpected. Similar data have beeen reported elsewhere (8). It was observed that children of index group had higher values of Tch, TG, LDLc and VLDLc (P<.05). Similar changes in lipoprotein spectrum has been noticed by other (8-16). The lipid and lipoprotein values obtained in the index group of hyper cholesteremic parents are similar to what has been observed by others (8-14) and suggesting it due to a hereditary nature. The higher levels of cholesterol triglycerides and LDLc in the index group was significant in these children whose parents had similar type of abnormalities in addition to CAD.

TABLE II : Showing Lipid profile mg/µl in relation to hypercholestormia in parents (of CAD) mean (S.D.)

Group	*Teh*	*TG*	*HDLc*	*LDLc*	*VLDLc*
I (n=31)	199.74 (52.83)	73.52 (18-29)	69.0 (10.16)	115.83 (46.99)	14.91 (3.75)
Ia (n=13)	179.38 (29.49)	68.31 (4.33)	69.92 (6.42)	95.90 (29.13)	13.68 (0.86)
II (n=314)	172.80 (15.19)	66.46 (12.64)	71.22 (13.22)	88.88 (22.90)	13.28 (2.52)
P Value	I:II <.05	P <0.5	P = N.S	P <.05	P <.05
	I:Ia N.S. Ia:II	N.S.	N.S.	N.S.	

The importance of estimating cholesterol alongwith other lipids for the diagnosis and treatment of CAD has been highlighted by previous workers. Relationship between lipoprotein fractions and CAD risk has been established (15-20). Our study has found high levels of Tch, LDLc and VLDLc and simultaneous low levels of HDLc in children of CAD patients. These results permit us to conclude that it is worthwhile to screen children of the parents who had CAD for lipoprotein in addition to Tch. Children of parents with combination of CAD and hyperlipidemia are at increased risk of developing early atherosclerosis and need lipid estimation screening.

REFERENCES

1. Strong JP, Mcgill HC. The pediatric aspects of atherosclerosis. *J Atherosclerosis Res* 1969; 9:251-265.
2. Kannel WB, Dewber TR. Atherosclerosis as a pediatric problem. *J Pediatr* 1972; 80:544-554.
3. Kannel WB, Feinleib M, Mcnamara PM, Garrison RJ. An investigation of coronary artery disease in families. The Framingham offspring study. *Am J Epidemiol* 1979; 100:281-290.
4. Mcmillan GC. Development of atherosclerosis. *Am J Cardial* 1973; 31:542-546.
6. Holman RL, Mcgill HC, Strong JP. The natural history of atherosclerosis. *Am J Pathol* 1958; 34:209-235.
7. Heldenberg D, Tamir I, Levtow O, Burstein Y, Werbin B. Lipoprotein measurements - a necessity for precise assessment of risk in children from high risk families. *Arch Dis Child* 1974; 54:695-698.
8. Mirza K, Ahmed P, Bilgrami N, Salahuddin A. Serum lipid and lipoprotein values in children of coronary artery disease parents. *Indian Pediatr* 1984; 21:235-240.
9. Zlatkis A, Zak B, Boyle AJ. A new method for the direct determination of serum cholesterol. *J Lab Clin Med* 1953.
10. Kessler G, Lederrer H. Fluorimetric measurement of Triglycerides, Automation in analytical chemistry. *New York Mediad* 1966; PP 341.
11. Bursten M, Shlinid NR, Morfin R. A method for estimating HDL cholesterol. *J Lip Res* 1970; 11:580-586.
12. Friedwald WT, Levy RI, Frederickson DS. Estimation of the concentration of low density lipoprotein cholesterol in plasma without the use of the preparative ultracentrifuge. *Clin Chem* 1972; 18:499-502.
13. Kumar K, Anand NK, Janah S. Serum lipid profile in children of parents with coronary artery disease. *Indian Pediatr* 1979; 76:1107-1114.
14. Khanna A, Srivastava S, Karmarker M, Tandon R, Ghai OP. Preliminary observations on the early detection of hyperlipidemia and hyperlipoproteinemia in children. *Indian Pediatr* 1979; 16(4):313-320.
15. Tamir I, Sojanowo V, Levtow O, Heldenberg D, Serum, Lipids and lipoproteins from families with early coronary artery disease. *Arch Dis Child* 1972; 44:808-810.
16. Castelli WP, Doyle JT, Gordon I, Hames CG et al. Cholesterol and other lipids in coronary artery disease. *Circulation* 1977; 55:767-772.
17. Perova N, Alingorn H, Metelskaya V, Dorofeera T, Gelokong N. Plasma lipid and apolipoprotein levels in children hereditarily predisposed to coronary artery disease. *Acta Pediatr Scand* 1988; 77:559-562.
18. Truett JR, Cornfield, J, Kanne W. A multi variete analysis of the risk of coronary heart disease in Framingham. *J Chronological Dis* 1967; 20:511-524.
19. Levy RI, Rafkind BM, Diagnosis and management of hyperlipo-proteinemia in infant and children. Am J Cardiol 1974; 31:547-556.
20. Laur RM, Counor WE, Leaverbon PE. Coronary artery disease rik factors in the school children, the Muscartine study. *J Pediatr* 1978; 86:697-706.