

Association of Subclinical Hypothyroidism and Dyslipidemia in Children and Adolescents

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Background

Subclinical hypothyroidism (SH) is defined as elevated TSH levels while T4 or FT4 levels are normal. In adults, Subclinical hypothyroidism has been correlated to higher levels of total cholesterol, LDL, non-HDL, TG and lower levels of HDL. Correlation of higher levels of TSH and dyslipidemia in children is controversial. As a result, we designed the study to assess the relation between lipid profile components and TSH levels in children and adolescence.

Method

This cross-sectional study was performed in a growth assessment clinic in Shiraz. Children aged between 2 to 18 years that came to the clinic for routine growth assessment follow up from January till April 2018 were considered. 847 children including 366 boys and 481 girls were included. Subjects were divided into two age groups: 2-9 and 10-18 year olds. TSH levels equal or above 5 and lower than 10 mIU/mL with normal FT4 were considered as subclinical hypothyroidism.

Results

666 children were euthyroid while 181 had subclinical hypothyroidism. Mean TC in euthyroid children was 160.50 ± 29.070 mg/dl and in SH group 161.39 ± 28.694 mg/dl ($P=0.713$).

Mean LDL-C in euthyroid children was 90.96 ± 24.996 mg/dl and in SH group 89.10 ± 23.852 mg/dl ($P=0.369$). Mean HDL-C in euthyroid children was 47.94 ± 10.560 mg/dl and in SH group 49.04 ± 10.361 mg/dl. ($P=0.211$). Mean non HDL-C in euthyroid children was 112.56 ± 27.696 mg/dl and in SH group 112.35 ± 28.136 mg/dl. ($P=0.929$). Mean TG in euthyroid children was 104.98 ± 54.934 mg/dl and in SH group 113.83 ± 91.342 mg/dl. ($P=0.215$). There was no significant difference in mean serum TChol, LDL, HDL, non-HDL and TG levels between euthyroid and subclinical hypothyroid children and in their respective 2-9 and 10-18 year old subgroups. There was no significant difference in prevalence of any of the lipid profile dyslipidemias between euthyroid and subclinical hypothyroid children and in the subsequent age related subgroups. Adjusted for age, gender and BMI Z-score, no correlation was seen between TSH levels and any lipid profile component. ($r=0.033$ $P=0.331$ for TChol, $r=0.015$ $P=0.657$ for LDL-c, $r=0.039$ $P=0.257$ for HDL-c, $r=0.020$ $P=0.554$ for Non-HDL-c and $r=0.019$ $P=0.584$ for TG)

Conclusion

By comparing the results of this study with other studies, it is evident that lipid disorder in subclinical hypothyroid children does not have a specific pattern.

Table 1. Mean lipid profile components (mg/dl) in subjects based on their respective thyroid status

	Total (847)			Age 2-10 (421)			Age 10-18 (426)		
	Euthyroid (666)	Subclinical Hypothyroid (181)	P	Euthyroid (325)	Subclinical Hypothyroid (96)	P	Euthyroid (341)	Subclinical Hypothyroid (85)	P
TChol	160.50 ± 29.070	161.39 ± 28.694	0.713	161.66 ± 29.842	160.73 ± 26.664	0.782	159.38 ± 28.314	162.14 ± 30.971	0.431
LDL- chol	90.96 ± 24.996	89.10 ± 23.852	0.369	92.54 ± 25.514	88.06 ± 21.540	0.119	89.46 ± 24.436	90.27 ± 26.302	0.788
HDL- chol	47.94 ± 10.560	49.04 ± 10.361	0.211	48.62 ± 11.077	50.09 ± 10.910	0.253	47.29 ± 10.016	47.86 ± 9.630	0.637
Non- HDL- chol	112.56 ± 27.696	112.35 ± 28.136	0.929	113.04 ± 28.081	110.64 ± 27.286	0.459	112.09 ± 27.358	114.28 ± 29.107	0.515
TG	104.98 ± 54.934	113.83 ± 91.342	0.215	97.18 ± 48.897	114.95 ± 104.861	0.111	112.40 ± 59.251	112.56 ± 73.757	0.983

Table 2. Correlation of each lipid profile component to serum TSH levels

Lipid Profile components	Correlation coefficient (r)	P value
TChol	0.033	0.331
LDL-c	0.015	0.657
HDL-c	0.039	0.257
Non-HDL-c	0.020	0.554
TG	0.019	0.584

Notes: Data are given in r and P values. Correlation coefficient was assessed by partial correlation method. Adjusted for age, sex and BMI Z-score
Abbreviations: TChol, total cholesterol; LDL-c, low-density lipoprotein cholesterol; HDL-c, high-density lipoprotein cholesterol; Non-HDL-c, non-low-density lipoprotein cholesterol; TG, triglycerides