

Impaired Hemorheological Parameters and Increased Carotid Intima-Media Thickness in Children with Subclinical Hypothyroidism

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Objective: Subclinical hypothyroidism (SH) is defined as elevated serum thyroid stimulating hormone (TSH) concentration associated with normal serum free thyroxine (fT4) levels. Treatment indication of SH in pediatric population is controversial. Hemorheology, a branch of biorheology focuses specifically on blood and its interactions in both macro- and microcirculation under the influence of the applied constraints. Effects of hypothyroid on hemorheology of patients had widely attracted the attention of researchers during last decade. The present study has been planned with the purpose to determine the effects of SH on hemorheological parameters and carotid artery intima-media thickness (CIMT) in children with SH.

Design and methods: 53 SH children (mean age 9.25 ± 4.28 years), 31 healthy controls (mean age 7.19 ± 5.15 years) were enrolled. Erythrocyte deformability, aggregation were determined by an ektacytometer and plasma viscosity (PV) by a cone-plate rotational viscometer. CIMT was evaluated sonographically.

Results: Erythrocyte deformability of SH group measured at 0.53, 1.69-30 Pascal were lower, than control. Erythrocyte aggregation index, aggregation half time and PV were not different between the groups. However, aggregation amplitude (AMP) and mean corpuscular hemoglobin concentration (MCHC) were significantly higher in SH compared to the control group. There was a negative correlation between TSH and deformability values measured at 5.33, 9.49, 16.87, 30.0 Pascal. CIMT was significantly higher than control group in patients with SH ($p=0.000$, SH= 0.48 ± 0.04 , control group= 0.43 ± 0.03).

	Control Group (n=31)	Subclinical Hypothyroidism (n=53)
Age(Years)	7.19±5.15	9.25±4.28
Gender(F/M)	(16/15)	(30/23)
Hb(gr/dl)	13.14±0.79	13.24±1.00
RBC (m/μL)	4.8±0.4	4.9±0.1
MCV (fL)	80.49±4.09	80.7±3.54
MCHC (g/dl)	32.7±1.2	33.3±0.78*
Ferritin (ng/ml)	35.38±13.37	28.85±14.93
Vitamin B12 (pg/ml)	416.19±181.9	472.33±176.76
CIMT(mm)	0.48±0.04	0.43±0.03

Conclusions: Increased erythrocyte aggregation and decreased red blood cell deformability in SH patients indicate adversely affected circulation in these children. Additionally, an increase of CIMT in children with SH demonstrated herein is known as a risk factor for the progression of atherosclerosis. Since our data show increased risk of developing cardiovascular diseases in SH, treatment of these children may be suggested as an appropriate approach.

