

Assessment of serum essential elements, serum glucose and thyroid function tests in Iraqi hypothyroid patients have good and poor responses to levothyroxine therapy

Abstract

Hypothyroidism is a syndrome resulting from deficiency of thyroid hormones leading to generalized slowing of all metabolic processes. Many diseases like hypertension, ischaemic heart disease, adverse lipid profile, and Metabolic abnormalities developed in hypothyroid patients. Trace elements play essential roles in the human body as cofactors of some enzymes and take part in the synthesis of many hormones where normal thyroid status is dependent on the presence of many trace elements for both the synthesis and metabolism of thyroid hormones.

Aim: The present study was designed to evaluate fasting serum Fe, Cu, and Zn concentrations, fasting serum glucose concentration and thyroid function tests in hypothyroid patients having good and poor response to LT therapy and to study correlations between these parameters.

Materials and methods: The present study was a single center, cross sectional study conducted in Alshefa General hospital, Basra, Iraq. During the period from June, 2013 to Mar, 2014. 62 subjects aged 20 to 55 years were included. The patient groups consisted of 41 hypothyroid patients (38 females and 3 males) on LT therapy for at least 6 months duration. 21 Healthy age and gender matched group with thyroid function within normal limit were selected as control group. Patients were screened for FT3, FT4 and TSH, those with high TSH level above normal limit despite high dose of thyroxine considered as poor response to treatment (PRLT) while those patient with TSH level within normal range considered as good response to treatment (GRLT). After 12 hrs fasting, blood samples (5 ml) were obtained to evaluate serum TSH, T3, T4, glucose and trace elements in all studies groups.

Results and discussion: In (GRLT) group 21 patients had thyroid function tests (TSH, FT4 and FT3) within normal range and there

were no significant differences when compared with control while in (PRLT) group, FT4 and FT3 significantly decreased when compared with control and GRLT groups while serum TSH levels in all 20 hypothyroid patients were significantly high. Serum Zn, Cu and Fe level of PRLT patients are significantly lower than its level in control and (GRLP) groups, In (GRLP) there were no significant differences when we compared trace element concentrations with control. Regarding FSG no significant differences were reported in all studied groups. There are significant correlation between thyroid function tests and trace element concentrations. Trace elements influence thyroid hormones at levels of action, including hormone secretion and activity and binding to target tissue. On the other hand, thyroid hormones itself influence trace metals metabolism at several levels of action, including excretion and transport of trace metals. All these factors collectively lead to significant reduction in trace elements concentrations in hypothyroid patients compared to normal control. Furthermore many reports demonstrate that effect of overt hypothyroidism on glucose metabolism is still a subject of debate this came in agreement with our study.