THE EFFECT OF IODINE DEFICIENCY ON REPRODUCTIVE FUNCTION IN GIRLS AND ADOLESCENT GIRLS IN CENTRAL ASIA

Gadjieva M.A.
Tashkent Pediatric Medical Institute
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Abstract*. The main consequence of iodine deficiency in the environment is the development of goiter in people living in iodine-deficient regions (endemic goiter). In this regard, for a long time it was considered that goiter is the only manifestation of this condition. Currently, it has been proven that, in addition to goiter, iodine deficiency has other adverse effects on the health of girls. in the 20st century, the term 'endemic goiter" was replaced by the term "iodine deficiency diseases" (IDD). These diseases are caused by a decrease in the functional activity of the thyroid gland in response to iodine deficiency in the population of Central Asia.*
Keywords*: children, iodine deficiency, endemic goiter, thyroid hormones.*

Iodine deficiency in the environment negatively affects the functional state of the thyroid gland, and this circumstance is the reason for the deterioration of the reproductive health of girls. It is known that iodine is an essential component of the synthesis of thyroid hormones (TG). Thus, thyroxine (T4) by 65%, and triiodothyronine (T3) by 59% consist of iodine. Consequently, iodine deficiency is accompanied by a decrease in TG levels, i.e. a decrease in the functional activity of the thyroid gland. It is noteworthy that the compensatory capabilities of the thyroid gland in terms of restoring organ function in conditions of iodine deficiency are extremely large. This fact becomes clear if we take into account the significant prevalence of iodine-deficient regions. In this regard, during the centuries-old evolution of mankind, mechanisms for adaptation to iodine deficiency have been developed. Several similar mechanisms are known. Thyroid hormones have a wide range of effects. The most important of them in childhood is the anabolic effect. Unlike other anatomical hormones, thyroid hormones not only and not so much control linear growth as regulate the processes of tissue differentiation. It is under the influence of thyroid hormones that children not only grow up, but also mature and mature. During the period of intrauterine life, under the control of thyroid hormones, the processes of embryogenesis are carried out, almost all organs and systems are differentiated and mature.

Thyroid hormones have an exceptional effect on the formation and maturation of the brain. No other hormones have a similar effect. In the early stages of intrauterine life, under the influence of thyroid hormones, the basic functions of the brain are laid and formed. The timing of brain differentiation is clearly limited in time. A deficiency of thyroid hormones at any stage of brain formation turns into a big disaster: the brain stops developing, undergoes degenerative changes, which dramatically worsens the intellectual and motor functions of girls. There are 2 main reasons for this situation. The first reason is that in recent years (over the past 20 years), the country has eliminated the system providing iodine prevention. It is safe to say that iodine prophylaxis is currently being carried out in Central Asia. The second reason for the increase in the intensity of the goiter endemia is the deterioration of the environmental situation in the country. It is known that many environmental factors in ecologically disadvantaged regions contribute to an increase

in the size and deterioration of the functional activity of the thyroid gland. Consequently, the deterioration of the environmental situation increases the effect of iodine deficiency and, thus, creates conditions for an increase in the intensity of goiter endemia. The combined influence of these factors often turns out to be so significant that a compensatory, sometimes even pronounced increase in the size of the thyroid gland is unable to normalize its function. At the same time, manifestations of hypothyroidism gradually increase, although clinically pronounced forms of the disease are extremely rare in childhood and adolescence. At the same time, during hormonal examination, more than half of children and adolescents with an enlarged thyroid gland show signs of so-called subclinical hypothyroidism: there is a tendency to decrease T4 levels or its low level, normal or slightly elevated T3 values and an increase in TSH levels. It is generally believed that the most reliable sign of subclinical hypothyroidism is an increase in TSH levels in the blood. It is noteworthy that the level of TSH in the blood of people living in iodine-deficient regions turns out to be higher during mass examination than in regions with sufficient iodine levels. The hypothalamus—pituitary—thyroid system in newborns is especially sensitive to iodine deficiency. In this regard, the level of TSH in the blood of newborns, determined during screening for hypothyroidism, is currently used as a criterion for the presence and severity of goiter endemia (see Table 2). The normal TSH level occurring in some individuals with an enlarged thyroid gland does not contradict the generally accepted opinion about the role of this hormone in the pathogenesis of endemic goiter, but rather indicates a good compensatory response of the hypothalamus—pituitary—thyroid system in response to iodine deficiency in this category of individuals. On a superficial examination, children and adolescents with subclinical hypothyroidism give the impression of being healthy. However, when conducting large population studies, it is possible to identify differences in the health status of children and especially adolescents with enlarged and normal thyroid gland sizes. At the same time, attention is drawn to the fact that children with goiter have worse indicators of physical and sexual development, study worse at school, their health condition is worse in many respects: they are more often and more seriously ill, more often have chronic diseases, changes in the cardiovascular system, blood parameters, etc. Older patients with endemic goiter may also show signs of subclinical, and in regions of severe iodine deficiency, clinical hypothyroidism. Iodine deficiency is most dangerous for this category of people in terms of the early development of atherosclerotic manifestations and cardiovascular disorders.

In women of childbearing age living in iodine-deficient regions, a violation of the function of the reproductive system comes to the fore. This is the cause of frequent infertility or spontaneous abortions. In the case of pregnancy, the children of these women have poor Apgar scores, they often have congenital malformations, they do not adapt well in the neonatal period, and often die in early infancy. The high incidence of congenital hypothyroidism in children born to mothers living in iodine-deficient regions is noteworthy. The frequency of this pathology in regions with sufficient iodine levels is on average 1: 4000 newborns. In regions with severe iodine deficiency, the incidence of congenital hypothyroidism according to screening data can reach 9-11%. In older children, this pathology is much less common in the same area. This indicates that, firstly, children with congenital hypothyroidism often die at an early age, and secondly, the percentage of transient hypothyroidism is very high in iodine-deficient regions. The duration of this form of hypothyroidism in most cases is several weeks, much less often several months after birth. This form of hypothyroidism is also dangerous in terms of damage to the cerebral cortex of the child.

In transient hypothyroidism, TG deficiency occurs at the end of pregnancy and in the 1st week of postnatal life, i.e. it is during that crucial period of central nervous system formation when the cerebral cortex is actively maturing. Subsequently, normal thyroid function is restored in these children, but intellectual disabilities remain for life.

So, in regions with severe iodine deficiency, patients with mild psychomotor disorders may constitute a significant segment of the population. It should be remembered that this circumstance can have a significant negative impact on the social and economic development of the region. In conclusion, it should be emphasized that in Central Asia, the problem of iodine deficiency is extremely urgent. In recent years, there has been a significant increase in the intensity of goiter endemia in many regions of the country. The reasons for this phenomenon are well known: iodine deficiency in the environment and the lack of iodine prophylaxis; a sharp deterioration in the environmental situation.

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