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FEATURES OF REPRODUCTIVE FUNCTION IN PATIENTS WITH TYPE 1 DIABETES MELLITUS LIVING IN IODINE-DEFICIENT REGIONS

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Abstract
This article analyzes the specific features of reproductive dysfunction in patients with type 1 diabetes mellitus residing in iodine-deficient endemic areas, examining the underlying pathogenetic mechanisms and clinical consequences. The study demonstrates that concurrent hyperglycemia, hypothyroidism, and disruption of the hypothalamic-pituitary-gonadal axis exert a synergistic negative effect on reproductive health in both male and female patients.

Keywords: Iodine deficiency, hypothyroidism, spermatogenesis, anovulation, gonadotropic hormones, TSH, testosterone, LH, FSH, hypothalamic-pituitary-gonadal axis, autoimmune thyroiditis, erectile dysfunction, amenorrhea, subfertility, hyperglycemia

Introduction

Iodine shortage more than 50 of the world in the country, including Central Asia in the region endemic problem as preserved remains. World health storage organization to their calculations according to, reproductive aged women between iodine shortage years during steadily increasing: in 1990 it was 171.3 per 100,000 population standardized indicator for 2021 reached 193.6. Sugar diabetes Type 1 (QD1) is exactly this aged the population damages - autoimmune natural This disease is often other autoimmune endocrinopathies, including autoimmune thyroiditis with together occurs. Iodine in short supply thyroid synthesis of hormones (T3, T4) decreases; this decrease pituitary gland gonadotropin secretion of hormones - LH and FSH directly from the trail produces, as a result reproductive function breaks down. With QD1 pain patients this two pathology one at the time to the effect encountered without further additional to danger face it comes, this and the clinicopathogenetics of the subject relevance defines.

Literature Comment

Dedov II and Melnichenko GA (2019) many author under the leadership of iodine of the shortage reproductive to the system impact thyroid-gonad arrow point of view from the point of view in detail covered. In the monograph of Fadeev VV (2012) hypothyroidism in the background inciting gonadotropin dysfunction mechanism, especially the LH pulsatile secretion violation shown. Petunina NA and In the works of Trukhin AA (2017) with QD1 pain in women autoimmune thyroiditis (ATI) development probability general to the population 3-5 times more than high that determined. Khudair A. and Butler AE (2025) Iodine amount spermatogenesis and testosterone to the synthesis both sufficient and excessive effects iodine in cases systematize analysis Rakhimov KD and

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Toshmatov Sh.A. (2020) Uzbekistan endemic in the regions resident in patients thyroid function reproductive to indicators the impact local in the population studied, Fergana valley in the population subclinical hypothyroidism hidden spread showed.

Main Part

Iodine shortage under the circumstances QD1 patients living actually two independent endocrine of the disease one in the body accumulation from the head forgives - this situation pathogenetic in terms of separately analysis demand Iodine shortage hypothyroidism gonadotropin dysfunction. Iodine - thyroid hormones synthesis for only important microelement. Its deficiency of T4 and T3 reduces, to this in response pituitary TSH compensator increases. Chronic high TSH level, a from the side, thyroid gland if you enlarge it, another on the other hand, hormones enough harvest unless brain hypothalamic-pituitary to the axis The result is a response signal that stimulates the release of GnRH (gonadotropin-releasing hormone). hormone) pulsatile secretion slows down, this and LH and FSH levels decrease brought QD1 's independent chronic in QD1 hyperglycemia Leydig cells (male sexual in the glands testosterone working issuer cell) and granulosis cells (in women) follicle in maturity central role playing cell) directly Glycation process because of this of cells membrane receptors perform their function loses; insulin signaling violation and gonadotropin signaling enough acceptance can not getting status to the surface brings. Therefore for hyperglycemia compensation The QD1 patient who did it also, if iodine shortage there is if, reproductive in the system double to suppression exposed QD1 + ATI combination. QD1 autoimmune a natural disease for other of organs autoimmune damage amplifier genetic predisposition available. Research shows that ATI develops in QD1 patients probability general to the population 3-5 times more than high. ATI in turn thyroid hormones synthesis reduces, in this way iodine shortage and hypothyroidism negative the impact further strengthens - we call it " three " what we call a " layered suppressor mechanism " possible.

Iodine in short supply hypothyroidism in the background male reproductive function violation one how many in the direction First, the T3 hormone Sertoli of cells maturity for physiological necessary: T3 is sufficient when this cells spermatogenesis supportive the environment Hypothyroidism under the circumstances Sertoli of cells maturity slows down, spermatozoa number and mobility Second, the LH surge decreases. Leydig in the cells testosterone synthesis brakes - this erectile dysfunction and libido decrease with clinical manifestation will be. QD1 this to the process additional accordingly diabetic neuropathy through erection mechanism breaks and sperm DNA fragmentation as a result of oxidative stress increases.

In women clinical appearance further subtle, but clinical for more important. LH pulsatile secretion violation ovulation stop to remain - to anovulation - to lead comes. As a result cycle permanent late, often oligomenorrhea or amenorrhea in the form of manifestation Prolactin level increase (hyperprolactinemia) - chronic hypothyroidism typical observation - galactorrhea and additional ovulatory suppression brought releases. With QD1 pain pregnant in women iodine shortage and hypothyroidism together spontaneously abortion and to be born child's neuromental in development defects probability sharp increases.

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Results

Analysis made literature and clinical observations based on iodine shortage in patients with QD1 conditions reproductive function of disorders following important results shown.

Hypothyroidism spread Frequency. QD1 in patients subclinical and manifest hypothyroidism general 3-5 times the population often occurs. Iodine shortage endemic in the regions this number further high because ATI is immunological predisposition and external iodine deficit each other strengthens. Man fertility indicators. Iodine shortage with non- QD1 in comparison, iodine shortage sperm concentration in existing QD1 patients on average 34-40% lower, progressive mobility and 28-35% lower Testosterone is observed. level and normative from the border below was in cases male hypogonadism typical clinical symptoms - fatigue, decreased libido, muscle tone decrease - list is taken. Women reproductive indicators. This in the group anovulatory cycle 2 times the probability high. ATI-positive QD1 in women during pregnancy first trimester spontaneously 3 times the risk of miscarriage increases because thyroid hormones deficit fetus neural of the tube correct formation for critical within the period enough no. Thyroid hormones replacement after the appointment of therapy (levothyroxine) then 3-6 months spermatozoa indicators in and ovulatory cycle stabilization is observed. However iodine shortage himself/herself eliminate if not enough, levothyroxine void when done relapse fast develops. This due to external iodine compensation and thyroid hormones replacement therapy one at the time take to go necessary.

Muhokama

Clinical aspects of this topic importance one how many point of view from the point of view see exit necessary. First, iodine shortage and QD1 combination reproductive to health impact still clinical in practice enough at the level into account not available: many endocrinologists in QD1 patients thyroid function routine control to do But with ATI 's QD1 together meeting is legal - this all at once The reason is also diagnostic. algorithm change necessary shows. Secondly, iodine shortage endemic regions, particularly Central Asia and Fergana in the valley, with QD1 pain all reproductive aged patients - 18-45 years old - thyroid hormones status and iodine metabolism according to mandatory from inspection to pass TSH, T4, T3, anti-TPO antibodies, urine iodine concentration is the minimum screening set reproductive violations early detection opportunity Third, treatment in the strategy iodine shortage eliminate if not enough, levothyroxine monotherapy enough Not. Endemic in the regions potassium iodine preparations preventive appointment, especially pregnancy planned in women, medicine in practice standard as consideration Finally, in men spermatogenesis violation clinical appearance often late is determined - because men fertility problems according to less appeal does. With QD1 pain iodine shortage in the regions resident in men spermogram and gonadotropin hormones assessment proactive in a way recommendation to be necessary.

Iodine shortage under the circumstances in QD1 patients living reproductive function violation three through a pathogenetic pathway done increases: iodine shortage hypothyroidism, QD1 gonadal cell dysfunction and QD1 ATI thyroid suppression. These three of the process synergistic impact infertility, anovulation, spermatogenesis violation and gonadotropin dysfunction in appearance manifestation It will be. Early screening, thyroid function mandatory monitoring and complex treatment - iodine compensation with levothyroxine therapy one at the time take to go - this group of patients reproductive forecast noticeable improves.

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