tic marker of the functional state of mitochondria and their disturbances for the evaluation of respiratory system in patients with type 1 diabetes mellitus.

KEYWORDS: diabetes mellitus, mitochondrial function.

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EFFICIENCY OF THE CRITERION OF NEONATAL THYROID-STIMULATING HORMONE IN MONITORING OF IODINE DEFICIENCY IN THE ENDEMIC TERRITORY

Makarova Olga, Suplotova Lyudmila

Tyumen State Medical University, Tyumen, Russia

Aim. To evaluate the effectiveness of using the criterion of neonatal hyperthyrotropinemia in monitoring of iodine deficiency in an endemic area. **Material and methods.** The analysis of thyrotropic hormone (TSH) indices in the whole blood of newborns was performed, determined within screening for congenital hypothyroidism in the Tyumen region for the period from 1994 to 2015. The study of neonatal TTG was performed based on the Tyumen regional perinatal center by the method of bilateral fluorometric linked immune ferment assay. Results of medical and biological monitoring during this period were used to establish the correlation: the frequency of iodine deficiency goiter among prepubertal children. Statistical processing of the material was done using the Statistica software package («StatSoft.Inc.», USA, 8.0). **Results.** In 1994, the World Health Organization (WHO) included the level of neonatal hyperthyrotropinemia above 5 mU/l, in the list of criteria for severity of iodine deficiency (ID) in the territory. According to WHO recommendations, for regions with a safe iodine supply, this indicator is determined in no more than 3% of newborns. The level of neonatal hyperthyrotropinemia above 5 mU/l in 2015 is defined in 5.3% of newborns (n=1253), which characterizes the Tyumen region as a territory with a slight iodine deficiency. During the implementation of the iodine deficiency prevention programs in the region, significant improvements were achieved in the 20-years period — the frequency of goiter among schoolchildren in the Tyumen region decreased from 87% in 1995 to 6.8% in 2016 ($p<0.001$). The incidence of neonatal TSH> 5 mU/l decreased from 44.7% in 1995 to 5.3% in 2015 ($p<0.001$). A highly positive statistically significant association was revealed between the neonatal TSH> 5 mU/l and the frequency of iodine deficiency goiter in prepubertal children group ($r = 0.94$, $p<0.05$), which indicates the effectiveness of neonatal hyperthyrotropinemia as a monitoring criterion for ID, which has a number of advantages comparing to other criteria of ID: at first, screening for congenital hypothyroidism covers all newborns, and secondly, the use of neonatal TSH data, determined within program, does not require additional financial costs. Thus, frequency of neonatal hyperthyrotropinemia criterion can be used both to evaluate the severity of ID in the region, and as a criterion for monitoring of the preventive programs implementation in endemic areas.

KEYWORDS: iodine deficiency, thyrotropic hormone.

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FEATURES OF DISTAL FOREARM FRACTURE IN PERSONS 50 YEARS OLD AND OLDER

Yurova Olga

CM-Clinica, Moscow, Russia

Objective. To identify the prevalent fracture risk factors in the group of persons 50 years and older. Assess their impact on BMD in patients with a distal forearm fracture (DFF-fracture of the radius) over 50 years at low injury. **Material and methods.** A comparative study among patients with DFF in the age group 50 years and older. Study based on medical records of city hospital traum depatment. Analised period 2009—2012. All patients underwent R-densitometry on the unit DTX-200, provided by Nicomed Takeda in the framework of the program «Russian Osteoscreening». **Results.** Hospital records of patients 50 years and older who suffered from low-energy fracture of the distal forearm were analyzed retrospectively for the period of 2009—2012. 791 patients were interviewed using standardized questionnaires «Osteoscreening Russia». According to the survey the metabolic syndrome (MS) diagnosed in 70.8% (560 persons). It included type 2 diabetes mellitus (T2DM) —14.8% (117 persons), prediabetes — 22.9% (181 people) — (Impaired glucose tolerance (IGT) and impaired fasting glucose (IFG)), obesity (33.1%) — an isolated cohort of patients with overweight and obesity without disrupting glycemic indices. All patients had DFF that occurred at a low injury. Among the investigated cohort of patients with highnormal bone mineral density (BMD above — 1.0 standard deviation (SD) we revealed 66.0% of patients with MS; 64.1% — with obesity; 65.4% — with the presence of pre-diabetes; 65.3% — with a history of type 2 diabetes. BMD — 1,0—2,5 SD: 20.6% with MS; obesity, 20.2%; prediabetes, 19.7%; type 2 diabetes —19.5%; BMD below 2.5 standard deviations (SD): MS at 13.5%; obesity, 15.7%; prediabetes, 14.7%; Type 2 DM —15.3%. Patients with low-energy DFF with a history of metabolic syndrome differed from the group of patients without this disease by its high and highnormal % normal BMD. Almost $^2/_3$ (70.8%) of patients with metabolic syndrome have normal BMD. **Conclusion.** The prevalence of low BMD in patients of investigated groups has not been established. Proposed mechanism of fracture is focused not on the performance of T-score (BMD) but the bone quality due to changes caused by abnormality of bone metabolism. Suppression of medullary osteoblastogenesis by adipocytes of bone marrow and stimulation of

proinflammatory cytokines synthesis leads to increased bone fragility without decreasing BMD.

KEYWORDS: fracture risk, osteoporosis.

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TRANSFORMATION OF PROLACTINOMA INTO CORTICOTROPIN-SECRETING ADENOMA IN PATIENT WITH MEN 1 SYNDROME: A CASE REPORT

Ludmila Rozhinskaya, Zhanna Belaya, Patimat Khandaeva

Endocrinology Research Centre, Moscow, Russia

Multiple endocrine neoplasia syndrome type 1 (MEN 1 type, Wermer's syndrome) is a group of heterogeneous inherited diseases, pathogenesis of which is based on hyperplasia or neoplasia of several endocrine glands, characterized by autosomal dominant mode of inheritance, high penetrance and similar prevalence among males and females. Prevalence of MEN 1 is estimated as 2—10 people per 100,000 of population. The patient turned to the doctor for the first time at the age of 20 with her primary amenorrhea. Examination revealed pituitary adenoma with pronounced secretion of prolactin (11,370 IU/L). She underwent transspenoidal adenomectomy, followed by drug treatment with dopamine agonists which normalized prolactin level, and restored menstrual function. At the age of 31 the acute gastrointestinal bleeding was the reason for further investigations and subsequent surgery. There were found gastrin-secreting tumor of the pancreatic gland and small tumors in the spleen area, as well as carcinoid in the mesentery area. At the age of 39 primary hyperparathyroidism (hypercalcemia, osteoporosis, high PTH level and parathyroid adenoma) was diagnosed. Parathyroidectomy was performed. Genetic analysis has revealed nonsense mutation Y77X in the Gene *Menin* in that patient and in her brother, thus MEN 1 type was confirmed. Nodular hyperplasia of both adrenals was visualized on CT. Disturbance of adrenocorticotrophic hormone secretion (in the morning 27 pg/mL, in the evening 33, 8 pg/mL) and cortisol secretion (in the morning 581 nmol/L, in the evening 338 nmol/L), high urinary free cortisol to 2,178 nmol/day, no suppression of cortisol secretion by 1 mg of dexamethasone were measured, and at the same time no clinical symptoms were detected. Cushing's disease was confirmed by inferior petrosal sinus sampling and functional tests. Pituitary surgery was not performed due to the absence of clinical manifestations of hypercortisolism. For the next 7 years active hypercortisolism was persisting, however clinical features appeared only last year. The patient underwent neurosurgical intervention in March 2017, remission of hypercortisolism was achieved. The clinical case may be called unique due the following reasons: multiple lesions of endocrine organs, of gastrointestinal tract; absolute synchronism of tumor development in various organs similar to those observed in her brother except hypercortisolism, as well as transformation of tumorigenesis in pituitary from prolactin-secreting tumor to ACTH-secreting tumor.

KEYWORDS: MEN 1 type; Wermer's syndrome; pituitary tumor; gene analysis.

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MOBILE APP ELECTRONIC DIARY IMPROVES THE MOTIVATION IN PATIENTS WITH GESTATIONAL DIABETES

Evgenii Pustozerov[1,2], Polina Popova[1,2], Aleksandra Tkachuk[1], Yana Bolotko[1], Andrei Gerasimov[1], Elena Grineva[1,2]

[1]Almazov Federal North-West Medical Research Centre, Saint-Petersburg, Russia; [2]Saint Petersburg State Electrotechnical University, Saint-Petersburg, Russia

Introduction. In the course of gestational diabetes (GDM) treatment, it is significantly important to keep track on records in a personal diary, which helps physicians and patients to understand the problems appearing during blood glucose (BG) compensation. At the same time, the lack of motivation can lead patients to stop making records and exchanging them with their doctor. In our study we analyzed, how the electronic diary app can improve the motivation of patients in comparison with traditional means of perceiving data on blood glucose. **The aim** of the study is to improve the motivation in gestational diabetes patients by providing them with helpful tools to keep track on their records. **Material and methods.** Android and desktop application DiaCompanion was developed and given to a group of patients with diagnosed GDM. Another group of GDM patients received a traditional diary via Excel spreadsheet. Patients from both groups were asked to fill the diaries with the data on BG levels, insulin injections (when prescribed) and, if possible, food intakes, physical activity, sleep and ketones (when prescribed). **Results.** By the middle of march 2017, a total of 179 patients with GDM received an application DiaCompanion and 36 patients recorded their BG levels via Excel spreadsheet. A total of 24914 and 4247 BG records were analyzed correspondingly. A significant difference was shown in the amount of women quitting keeping records (6.0% vs 19.4% patients with less than 2 weeks of reports, p=0.029) and the average number of days with records (53.0 days against 40.2 days, p=0.006). Considerable amount of patients used an app to track additional records, while patients with traditional diary rarely reported any (98.6% against 44.4% reported food intakes (p=9.97·e-8), 59.6% vs 22.2% reported physical activity (p=6.64·e-6), 37.2% vs 5.6% sleep (p=6.37·e-9) and 21.6% vs 11.1% ketones (p=0.044) correspondingly). Average fasting BG levels during the whole course of monitoring were lower in women who used the app (4.88 vs 5.01 correspondingly, p=0.048), while postprandial BG values didn't show significant dif-