Clinical and Prognostic Significance of Serum Uric Acid as a Marker Complicated Course of Gout on the Background Pathology of Digestive Tract

Introduction. According to statistics, gout — the most common cause of arthritis in men older than 30 years. At present, the disease is considered not only as clinicians recurrent monoarthritis, but as a systemic disease with severe visceral manifestations. It is therefore timely diagnosis of gout and its visceral manifestations, early and appropriate treatment of the main nosology and related pathologies has clinical and social importance for these patients.

The aim of our study was to investigate the features of primary gout against pathology of the gastrointestinal tract (GIT), depending on the level of serum uric acid (SUA).

Materials and methods. 25 patients with gout complicated by GIT pathology were examined. The investigation of patients included general clinical and laboratory methods (including assessment of articular syndrome, SUA level by uricase method), radiographic (joint X-ray). According to history, we detailed the duration of gout (first of all specific symptoms), the number of affected joints and tophi in the course of the disease and at the time of inspection. The intensity of pain joint syndrome evaluated on a ten visual analogue scale (VAS). Gastrointestinal pathology was diagnosed according to the criteria relevant diagnostic nosology.

Results. Patients had different clinical gout variants: asymptomatic hyperuricemia, intermittent gout, chronic gout. Tophi were found in 6 patients. SUA level varied in the range from 360 to 731 mmol/l. To investigate the influence of SUA on the course of gout and gastrointestinal pathology, patients were divided into 2 subgroups according to the degree of hyperuricemia: the first subgroup (12 patients) with hyperuricemia greater than 600 mmol/l, the second subgroup (13 people) with moderate hyperuricemia 360–600 mmol/l. The severity of the disease was caused by a large number of affected joints (minimum 3, maximum 10) and the number of inflamed joints at inspection (2 to 6), high frequency of exacerbations joint syndrome during the year (min — 2, max — 8 times a year), duration last exacerbation (4—10 days). Localization arthritis was the following: the first metatarsus-phalangeal joints, ankle, knee and elbow joints, small joints of hands. The painful articular syndrome patients assessed with VAS scale from 5 to 10 points.

Radiographic changes in affected joints were presented as following: the moderate local osteoporosis, vacuole-like bone defects with a rim of sclerosis; small erosion on the articular surfaces; consolidations and thickening of soft tissue, calcifications in soft tissues, signs of secondary osteoarthritis. These features correspond to the simultaneous existence of phenomena of degradation, degeneration and regeneration. The phenomena of osteoporosis were discovered in patients with chronic gout, while as erosive changes detected at hyperuricemia and tophi gout.

Pathology of the digestive tract was presented by gastroesophageal reflux disease with esophagitis (24.0 %) and without esophagitis (32.0 %), gastritis and/or duodenitis (16.0 %) and chronic colitis (28.0 %). Erosive changes in the mucosa of the gastrointestinal tract were observed at high hyperuricemia and tophi gout (24.0 %).

Conclusion. At gout complicated by gastrointestinal disorders, there is a severe course of articular syndrome caused by a large number of affected joints and a high index of severity of gout. X-ray picture of the affected joints and endoscopic findings in the gastrointestinal tract characterized by changes, the severity of which depends on the degree of hyperuricemia. At high values of uric acid (> 600 mmol/l) there are erosive changes and phenomena of inflammatory erosive changes in the gastrointestinal tract mucosa.

Application of Natural Factors for Prophylaxis and Treatment of Patients with Osteoarthritis with Low Bone Density

Introduction. Osteoarthritis (OA) — a chronic progressive disease of the joints, which revealed not only in losing of joint cartilage but also changes in bone tissue. Proved combination of influence of osteoarthritis and osteodeficiency on each other as the state of bone mass of the skeleton affects the clinical manifestations and reflects on course of osteoarthritis. Nevertheless there are some differences in the issues of etiology and pathogenesis of OA, there is no doubt about the perspectives of a comprehensive treatment of OA by finding medication and environmental factors that can influence the basic mechanisms of pathological process — a violation of bone and cartilage tissues. One of the most effective treatment methods of degenerative-dystrophic diseases of the musculoskeletal system is sulfide balneotherapy. The mechanism of therapeutic action of hydrogen sulfide treatment in OA is mediated by activation of protective and adaptive forces (primarily the immune and
pituitary-adrenal systems), and increased local blood and lymph circulation, improve metabolic and trophic processes, activation of regenerative factors.

Aim of the studying — to study biochemical markers of bone metabolism in patients with osteoarthritis with reduced bone density using of sulphide balneotherapy in the rehabilitation period.

Materials and methods. We observed 56 individuals (women) with osteoarthritis of the knee joints with reduced bone density, age 43–72 years (average 55.92 ± 1.05 yrs), disease duration 2–18 years (7.76 ± 0.60). All patients were in menopausal period, menopausal duration from 1 to 18 years (6.89 ± 0.64 yrs) had not concomitant pathology that could affect the metabolism of bone tissue. X-ray stage of OA determined according to the classification of J.N. Kellgren and J.S. Lawrence (I stage — 12 patients, II stage — 38, III stage — 6). In a serum of blood samples were detected indicators of mineral metabolism (total content of calcium and inorganic phosphorus) and markers of bone formation (alkaline phosphatase, parathyroid hormone (PTH)). Indicators of bone mineral density (BMD) were determined by using double-photon X-ray densitometry (Dual Energy X-Ray Absorptiometry — DXA) Lunar corp. company (Madison, WI) — Lunar DPX-A. In 39 patients were diagnosed osteopenia, in 17 — osteoporosis. All patients were at the sanatorium stage of rehabilitation and by the method of randomization were divided into two groups. Treatment complexes in two groups includes procedures of spa — treatment and differed by using of balneofactors: in the first group were used hydrogen sulfide baths, a concentration of 80 mg/L for 15 minutes at a temperature of 36–37 °C, at the course of 8 treatments; in the second group — sodium chloride bath concentration of 25 g/L, for 15 minutes at a temperature of 36–37 °C, at the course of 8 treatments.

Results. Indicators of mineral metabolism in patients with OA had not significant changes after treatment and accurate dynamics of these parameters in both groups were not observed. The level of alkaline phosphatase under the influence of sulphide balneotherapy compared with medical complex using sodium chloride baths decreased (from 142.39 ± 2.18 U/I to 124.71 ± 3.60 U/I in group I, group II in 135 57.00 ± 1.79 U/I), PTH levels also had positive dynamics under the influence of hydrogen sulfide baths (with 78.9 ± 3.8 pg/ml to 63.2 ± 2.9 pg/ml and group II in group 77.9 ± 4.3 pg/ml), which suppose to think about a slowdown of bone remodeling processes under the influence of sulphide balneotherapy.

Conclusion. Treatment complex with the inclusion of hydrogen sulfide baths in patients with osteoarthritis with low bone density has not only analgesic effect but also allows you to impede the bones mass loss and, therefore, can be used not only for the treatment of osteoarthritis with reduced bone density but also for the prevention of osteoarthritis and osteoporosis.
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Bone Mass and Osteoporotic Fractures in Hyperthyroid Adults

Overt hyperthyroidism is a clinical condition caused by exaggerated levels of circulating thyroid hormones. Some of its main etiological factors are the hyperfunction of the thyroid gland and the iatrogenic cause, like the ingestion of excessive doses of thyroid hormones.

The potential risks of hyperthyroidism are diverse and can vary from patient to patient; however, heart and bone complications are relatively common, especially among the elderly. Regarding the adult skeleton, several abnormalities were described, namely reduced bone mineral density (BMD) and a higher osteoporotic fracture risk. Indeed, hyperthyroidism has been recognized to be an important cause of secondary osteoporosis and a risk factor for hip fracture in women. Moreover, these osteoporotic fractures are associated with a risk of precocious mortality, namely in the elderly.

In adult life, after the acquisition of the peak bone mass, the excess of circulating thyroid hormones can lead to an increase in bone resorption, either by acting directly on osteoclasts or indirectly on osteoblasts. Bone remodeling accelerates while the bone formation period is decreased, originating an incomplete substitution with new bone cells and loss of mineralized bone. Hypercalcemia, hypercalciuria and a negative balance of calcium were also described.

Furthermore, TSH is a negative regulator of bone remodeling, inhibiting the formation, the survival of osteoclasts and the differentiation of osteoblasts. Recent studies have shown that low TSH levels, per se, can lead to osteoporosis and fragility fractures.

In old and young Portuguese patients with endogenous hyperthyroidism, both men and women, significant decreases in the BMD in several skeletal regions and an increase in the prevalence of osteoporosis/low BMD were observed. Moreover, in young Portuguese men with hyperthyroidism, we found a trend for an increase in the prevalence of osteoporotic vertebral fractures detected by VFA.

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The Defeat of Bone Tissue in Patients with Fatty Illness of Liver

Introduction. The course of chronic diseases of liver is accompanied by important disturbances of mineral exchange, calcium–regular hormones, that creates preconditions for the disbalance of processes of remodeling of bone tissue and forming of osteopenic syndrome.

Aim of work: to investigate frequency and character of clinico-instrumental signs of the defeat of bone tissue for patients with fatty illness of liver.

Materials and methods. The results of investigation were analyzed in 62 patients with the signs of moderate steatos liver (verified from data of BRIDLES), among them: women were 36 (58.1 %), men 26 (41.9 %). Average age of patients was 46.4 ± 3.2. The structural-functional state of bone tissue was determined by the method of ultrasonic densitometry. It was investigated the state of bone tissue and forming of osteopenic syndrome.

Examination of patients with the high risk of osteoporosis the method of BRIDLES revealed the presence of osteopenia in 30 patients (48.3 %) of patients, from them in 12 (19.3 %) persons mass of body was less than 50 kg. At an objective inspection in 18 (29 %) patients were observed strengthening of pectoral kiphosis, compensatory hyperlordosis, increase in the index Forestier, and duration of fatty illness of liver (r = 0.77 (p < 0.001). The correlation analysis also revealed a relationship between the index of WWU, which represents quality of bone, and duration of fatty illness of liver (r = 0.77 (p < 0.001).

Conclusion. At clinico-instrumental inspection the presence of osteopenia is set in every second from all patients with fatty illness of liver, here osteoporosis — in every one in five of them. For women the presence of osteopenia appeared in 1.7 times more frequent than for men, osteoporosis — in 4.9 times.
Vitamin D Content in Adolescents with Rheumatic Diseases

Background. Vitamin D deficiency in rheumatic diseases (RD) is one of the factors, causing the development of osteopenia and its complications (spontaneous fractures or fractures at a light load) due to its regulation of calcium metabolism. It is widely accepted that calcium is involved in the significant physiological processes in most of the cells of the organism, it also regulates secretion of a number of key hormones, enzymes and proteins. All the above serves as a reason for the prescription of preventive doses of vitamin D metabolites to ensure calcium effective absorption, when Ca-containing medicines are included in the treatment programs of patients with RD. However, some additional biological effects of calciferol, not related to the regulation of calcium and phosphorus homeostasis, are being widely discussed recently. Due to these effects vitamin D, contained in the human body, is regarded as a hormonal agent. It has been established that its metabolism (1α-hydroxylation of 25-OH-calciferol) occurs in many tissues. Extrarenal 1.25(OH)2 acts as anabolic processes in RD. The rate of the bone mass loss is an indicator of systemic activity of RD and the type of metabolic activity of calciferol in the bone and other affected tissues. There is evidence that a genetic predisposition to the development and severity of the disease, the impact of its deficiency on the RD pathogenesis, the types of metabolites, outlines and doses of their prescription for children and adolescents with RD are being verified.

The aim: to determine the content of the active metabolite of vitamin D in the blood of children with RD, namely: systemic lupus erythematosus (SLE), dermatomyositis (DM), juvenile rheumatoid arthritis (JRA) as well as its relationship with the severity of the pathological process.

Materials and methods. The level of 25-OH-vitamin D3 was determined by electrochemiluminescent immunoassay (ECLIA) in 17 patients, aged 9–18 years, (mean age — 12.9 ± 4.0 years), predominantly girls (82.4 %) with JRA (58.8 %), DM (29.4 %), and SLE (11.8 %). Values, exceeding 50 ng/ml, were regarded as normal, in the range of 30–50 ng/ml (due to nutritional deficiency) as reduced, and below 30 ng/ml as low.

Results: the age of the disease onset in children was 9.3 ± 2.5 years, and duration of the disease averaged 2.7 ± 1.3 months. The disease activity corresponded to the 2–3 degrees. Glucocorticoid therapy received 58.8 % of the patients, cytosotaxes (cyclophosphamide and methotrexate) were given to 70.6 % of patients, all of our patients were treated with calciferol containing vitamin D (daily dose 200 IU). The level of 25-OH-vitamin D3 in all the patients was reduced, while in 17.6 % of our finding were above 30 ng/mL, and in 82.4 % its absolute deficiency was registered. Blood values of 25-OH-vitamin D3 came to 22.9 ± 2.4 ng/mL (16.1–32.5 ng/mL), they correlated with the age of our patients (r = 0.89, p < 0.01) and were not dependent on the RD nosology, as well as on immunological and biochemical indices of the disease activity.

Conclusion. Investigations, carried out in the study, have shown a pronounced deficiency of the main metabolite of vitamin D in children with RD, despite the intake of its medications in the combined treatment. This necessitates an additional prescription of the D3 active metabolite for children with all key RD diseases, especially for the younger children. According to the current European recommendations, an additional dose of D3 for children with RD should reach 2–4 thousand in IU.

Extraskeletal Effects of Vitamin D3 Deficiency in Infants

Introduction. Last years much attention is paid to studying the role of vitamin D in the formation of extraskeletal pathology. Epidemiological studies were conducted to show a relationship between vitamin D deficiency and a higher level of respiratory infections [1–3]. At the same time the influence of vitamin D sufficiency in the development of acute respiratory infections in children has been less studied [2].

Therefore, the aim of our study was to explore the role of vitamin D in the formation of recurrent flow of respiratory infections in young children.

Materials and methods. There were 52 children in the study group (26 girls and 26 boys) aged from 13 to 36 months, the frequency of respiratory infections was 6 and more times a year; control group consisted of 50 children (of similar age and sex) with a frequency of episodes of respiratory diseases 5 a year or less. All the children were given standard prophylactic dose of vitamin D3, the symptoms of rickets were absent.

The level of vitamin D provision was assessed by determining the 25(OH)D3 by immune chemiluminescent method using the apparatus Elecsys 2010 Roche. The
study of immune parameters was carried out by direct rosette method of erythrocytes coated with monoclonal antibodies. Descriptive statistics are given as median and interquartile range. Comparison of parameters was performed by Mann–Whitney test (U-Test). To understand the nature and the coupling between the studied parameters we used Spearman rank correlation coefficient.

Results. There was an essential, statistically significant (U = 24.00, Z = 3.09, p = 0.002) difference between the level of 25(OH)D in children with the recurrent respiratory infections (32.70 [23.03–39.81] ng/ml) and in occasionally ill children (46.36 [40.21–52.51] ng/ml).

Among children who were predisposed to recurrent respiratory disease course, children with subclinical deficiency of vitamin D dominated — 50 %, 6 % had an extreme shortage of vitamin D, and in 44 % of cases the level of vitamin D was sufficient. In the control group — twice as many children have an adequate vitamin D level (88 %), 12 % had subclinical vitamin D deficiency (according to a scale of Cianferotti and Marrocchi (2012) [1]). Analysis of the level of vitamin D in children predisposed to recurrent respiratory disease course according to the months of the year found that 25(OH)D3 did not reach sufficient levels (above 30 ng/ml) in March, April, and in autumn. Optimal levels (above 60 ng/ml) on average were not recorded, even in the summer months.

A moderate direct correlation was discovered between levels of 25(OH)D3 and the relative and absolute number of CD25+ and the relative number of CD8+, CD95+ (p < 0.05; weak direct relationship was detected between the level of 25(OH)D3 and the following parameters: number of lymphocytes, relative and absolute number of CD4+, CD16+, absolute number of CD8+, CD95+, phagocytosis completeness index, index NBT-test.

Conclusion. In infants with recurrent respiratory infections with no signs of rickets level of 25(OH)D3 was almost two times lower than in their occasional ill peers, which may indicate extraosseal action of vitamin D, including the immune response influence. This necessitates determining the level of vitamin D in children with recurrent infections and its correction.

References
Comparative Estimation of Electromyographic and Imaging Study Indicators of Sarcopenic-Related Alterations of Paravertebral Muscles

Introduction. The advancing age and degenerative lumbar spine diseases are accompanied by a pronounced decreased muscle mass and quality, but investigators lack of available and informative markers of such kind impairments. Electromyography (EMG) has some advantages being not as invasive as biopsy and cheaper than computer tomography (CT). The muscles bioelectrical activity generation is based on the strong relationships between muscle fiber diameter and its conduction velocity. The spectral analysis of complicated interference muscle signal permits to distinguish and recognize the prevailing frequency and amplitude components. The aim of the study is to find out age-related EMG spectral components and to interconnect age-related EMG spectral components with CT results.

Participants. A group of healthy students-volunteers has been recruited from Kharkov higher schools and employees of SISJP UAMS. A group of degenerative diseases of the lumbar spine inpatient patients has been recruited from a vertebral clinic of SISJP UAMS. The participants were divided by age as follows: adolescence (10–15 yrs), youth (16–20 yrs), mature age (21–34 yrs), adulthood (35–54 yrs), advanced age (55–75 yrs), old age (> 75 yrs).

Testing procedure and equipment. The EMG test was performed in the prone position on a horizontal couch. During the test each subject was suggested to fulfill a specific action. Testing procedure and equipment. The EMG test was performed in the prone position on a horizontal couch. During the test each subject was suggested to fulfill a specific action.

Results. From EMG analysis we found out a significant difference between the healthy group and degenerative disease patient group in terms of TotalP, MedF, mean frequency (MF), peak frequency (PF), start median frequency (startMedF), end median frequency (endMedF) and MedF rate were calculated. Statistical processing of data was fulfilled by Mann Whitney U-test and Kruskal-Wallis analysis. Furthermore, 663 axial CT images of 129 mature patients (21–75 years) and 93 youth (under 21 years) were studied. Some areas of paravertebral muscles were selected on axial slices of CTs of 7–10 mm diameter and were selected 3,978 samples of muscle tissue. The minimum and maximum values of X-ray density, its average value, standard deviation, and two peak values (in Hounsfield units) were analyzed [2].

Conclusion. The spectral indicators of TotalP, MedF, startMedF of m.erector spinae myograms have significant dependence on age. The findings are in agreement with the values of X-ray density reflecting sarcopenic muscle tissue percentage. EMG can be suggested to measure age-related and degeneration-related changes in paravertebral muscles and it needs further investigations.

References
Some Problems of Early Diagnostics of Diabetic Arthropathy

Introduction. With such complication of diabetes mellitus (DM), as diabetic osteoarthropathy (DOA or Charcot foot), there are doctors of different specialties, but far not always it in time is recognized. Prevalence of this complication among patients on (DM) folds less than 1 %, although in literature there are data about the defeat of bone fabric in 0.1–55 % of patients. Such large divergence of data, probably, related to the differences in methodology of inspection and different criteria of diagnostics of DOA. Consider now, that DOA causes any not form of neuropathy, its «subspecieses» are but only certain. In this connection to foresee development of DOA difficult, and late diagnostics and inadequate treatment of patient result in invalidation.

Aim of work: to investigate frequency and character of clinico-instrumental signs of defeat of bones' tissue for patients on DFS.

Materials and methods. The analysis of results of inspection is conducted 62 patients on DM 2 to the type, complicated SFS. Men it was 36 (58.1 %), women 26 (41.9 %). Middle age of patients presented 56.90 ± 1.02. Experience of DM laid down 12.90 ± 1.02. A questionnaire was used by means of minute test of estimation of risk of osteoporosis, method of ultrasonic densitometry and radiography.

Results and their discussions. Distribution of the investigated patients depending on the clinico-pathogenetic form of DFS was such: 14 patients (22.6 %) had neuropathic form, 18 (29.0 %) — ischemic and 30 patients (48.4 %) — mixed. From data of anamnesis, from 62 patients on DM the diagnosis of DOA was first set to 47 (75.8 %) patients, from them 92.2 % — at presence of III–IV of the stage of DOA. A questionnaire by means of minute test and analysis of anthropometric data of patients allowed to distinguish patients (35 persons — 56.4 %) with the high risk of presence of osteoporosis. From data of anamnesis, 34 (54.8 %) patients had an episode of manifestation of DOA as an one-sided sharp edema of foot. Mostly (in 37.5 % cases) patients saw a doctor of general practice or surgeon of policlinic, but manifestation of the sharp stage of Charcot foot was not diagnosed. At radiography research of bones' of foot of sign of osteoporosis deduced in 9 (14.5 %) patients from the number of inspected (mainly with the neuropathy form of DFS); in 27 (43.5 %) patients from all cases the deduced phenomena of ossifluence, presence of bone sequestra, osteomyelitis (mainly at the ischemic and mixed forms of DFS). Conducted inspection of patients with the high risk of osteoporosis deduced the presence of osteopenia the method of ultrasonic densitometry in 30 patients (48.3 %), from them in 12 (19.3 %) is an osteoporosis, that folded 34.3 % from the group of high risk.

Conclusions. The presence of sharp phase of DOA is necessary to be assumed for all patients with the one-sided edema of foot, taking into account duration of motion of DM, expressed of diabetic neuropathy, trauma or surgical interference on a foot, that preceded to the edema. A radiography inspection of patients is the late method of diagnostics of defeat of bone fabric, that does not allow effectively to conduct the prophylaxis of osteopenia and timely treatment of osteoporosis. For stratification of risk of osteopenia for patients from DFS it is necessary to use a minute test with verification of degree of defeats of bone fabric by means of densitometry. Patients with suspicion on DOA most rationally to send in the specialized podiatric separations (centers).

Diagnostic Criteria of the Bone Mineral Density Reduction in Children with Hepatobiliary Pathology

Introduction. Preclinical diagnostics of metabolic bone pathology in children is of great importance for the prevention of osteoporosis (OP), its timely correction and formation groups of high risk for osteopenic syndrome.

Aim: To develop methods of predicting the osteopenic syndrome in children with disorders of hepatobiliary system with the following development of forecasting algorithm.

Materials and methods. Comparative analysis of risk factors for OP development based on the history of life, results of clinical and laboratory investigation and densitometrical examination allowed to select 9 signs which were considered as informative diagnostic criteria of preclinical OP development.

Results. Results of a consecutive detection procedure, based on the review of ordered series of signs in the comparison groups and the sequential analysis of selected pairs of distribution, are presented in the table 1.

The process of forecasting is as follows: in every patient we have determined the value of each risk factor, which corresponds to a specific diagnostic factor, in the order they are presented in the table. Then diagnostic factors were added until one of the thresholds has not been reached. If the threshold A2 = +13 was achieved or exceeded, then with a probability of 95 % the risk of reduced bone mineralization in a child can be predicted. If the threshold is A1 = –13, with the same probability the risk of pathology can be denied. If the threshold of ±13 was not reached the next decision was made: there was not enough diagnostic information for resolving the issue with the planned reliability level and it is necessary to continue to study risk factors (undefined response).

Conclusion. Retrospective analysis of risk factors for the osteoporosis development in examined children has demonstrated a relatively high accuracy (87.9 %) of osteoporosis prediction using the presented table, so that allows to recommend it for revealing the probability of bone mineral density reduction in certain patients with hepatobiliary disorders.
Table 1. The distribution of risk factors for osteopenic syndrome development by diagnostic coefficient and informative signs

<table>
<thead>
<tr>
<th>The risk factor</th>
<th>The presence of factor</th>
<th>CCC</th>
<th>CC</th>
<th>BD</th>
<th>CVH</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>DF</td>
<td>IX₁</td>
<td>DF</td>
<td>IX₁</td>
<td>DF</td>
</tr>
<tr>
<td>Body Mass Index</td>
<td>≤ 18.45 kg/m²</td>
<td>6</td>
<td>1.53</td>
<td>3</td>
<td>0.34</td>
</tr>
<tr>
<td></td>
<td>&gt; 18.45 kg/m²</td>
<td>-8</td>
<td>2.44</td>
<td>-5</td>
<td>0.4</td>
</tr>
<tr>
<td>Level of rumal antibodies in the blood</td>
<td>≤ 24.0 cu.</td>
<td>-7</td>
<td>1.82</td>
<td>-3</td>
<td>0.54</td>
</tr>
<tr>
<td></td>
<td>&gt; 24.0 cu.</td>
<td>6</td>
<td>1.06</td>
<td>6</td>
<td>0.72</td>
</tr>
<tr>
<td>The pathology of bone system</td>
<td>Absent</td>
<td>-2</td>
<td>0.27</td>
<td>-1</td>
<td>0.19</td>
</tr>
<tr>
<td></td>
<td>Incorrect posture</td>
<td>-1</td>
<td>0.21</td>
<td>-1</td>
<td>0.18</td>
</tr>
<tr>
<td></td>
<td>Scoliosis</td>
<td>6</td>
<td>1.35</td>
<td>2</td>
<td>0.62</td>
</tr>
<tr>
<td></td>
<td>Caries</td>
<td>5</td>
<td>1.23</td>
<td>2</td>
<td>0.56</td>
</tr>
<tr>
<td>Hypocalcemia</td>
<td>Present</td>
<td>1</td>
<td>0.08</td>
<td>5</td>
<td>1.83</td>
</tr>
<tr>
<td></td>
<td>Absent</td>
<td>-1</td>
<td>0.12</td>
<td>-2</td>
<td>0.33</td>
</tr>
<tr>
<td>Pain in the spine and legs</td>
<td>Present</td>
<td>7</td>
<td>1.63</td>
<td>3</td>
<td>0.33</td>
</tr>
<tr>
<td></td>
<td>Absent</td>
<td>-1</td>
<td>0.19</td>
<td>-1</td>
<td>0.18</td>
</tr>
<tr>
<td>Oxyproline level in the blood</td>
<td>≤ 35.24 mkmol/l</td>
<td>-3</td>
<td>0.48</td>
<td>-2</td>
<td>0.76</td>
</tr>
<tr>
<td></td>
<td>&gt; 35.24 mkmol/l</td>
<td>3</td>
<td>0.48</td>
<td>3</td>
<td>0.57</td>
</tr>
<tr>
<td>The body weight of the child at birth</td>
<td>≤ 2900 g</td>
<td>4</td>
<td>0.46</td>
<td>3</td>
<td>0.38</td>
</tr>
<tr>
<td></td>
<td>&gt; 2900 g</td>
<td>-1</td>
<td>0.19</td>
<td>-1</td>
<td>0.19</td>
</tr>
<tr>
<td>Mitral valve prolapse</td>
<td>Present</td>
<td>4</td>
<td>0.54</td>
<td>1</td>
<td>0.37</td>
</tr>
<tr>
<td></td>
<td>Absent</td>
<td>-2</td>
<td>0.27</td>
<td>-1</td>
<td>0.26</td>
</tr>
<tr>
<td>The level of bilirubinemia</td>
<td>Raised</td>
<td>3</td>
<td>0.42</td>
<td>2</td>
<td>0.29</td>
</tr>
<tr>
<td></td>
<td>Normal</td>
<td>-2</td>
<td>0.32</td>
<td>-1</td>
<td>0.18</td>
</tr>
</tbody>
</table>

Notes: CCC — chronic cholecystocholangitis, CC — chronic cholangitis, BD — biliary dyskinesia, CVH — chronic viral hepatitis, DF — diagnostic factor, IX₁ — indicator informativity.

Joint Pain Perception Features in Children with Juvenile Rheumatoid Arthritis and Their Parents

Introduction. Juvenile rheumatoid arthritis (JRA) is a chronic disease that requires a doctor’s constant assessment of the patient’s condition for timely decision about important changes in therapeutic tactics. In the clinical picture of the disease the center place pain belongs.

The aim of the research was to determine peculiarities of pain perception by suffering from juvenile rheumatoid arthritis children and their parents.

Materials and methods. The 99 children were examined — 60 sick by JRA patients and 39 healthy children. Selected groups were matched by the sex, age, and nationality. The intensity of joint pain was assessed by the using of visual analogue scale (VAS) in children and their parents. Children aged 6–10 years were interviewed by VAS with pictures that reflect the grimaces of pain. Patients above 10 years and their parents were interviewed by simple VAS.

Results. Established that patients with JRA and their parents had the same assessment of articular pain intensity (3.5 ± 0.3 cm, 4.5 ± 0.6 cm; p > 0.05). In the group of healthy children the average body pain during the last week was 0.5 ± 0.2 cm by children assessment, and 0.6 ± 0.2 cm by parents assessment (p > 0.05). The level of pain intensity determined in accordance with the VAS gradation revealed the following features. 7.1 % of patients with JRA didn’t feel joint pain during last week (0 cm). 41.1 % of children had mild pain (0.1–3.9 cm), 33.9 % had moderate pain (4.0–5.9 cm), 17.9 % had severe pain (6.0–7.9 cm). Their parents indicated absence of joint pain in 6.8 % of children, mild pain in 42.4 %, moderate pain in 33.9 %, severe pain in 10.1 %, very severe pain in 6.8 % (8.0–10.0 cm).

Depending on the therapy all patients were divided into two groups. Children of the first group (n = 24) received basic therapy with a low-dose of methotrexate (7.5 mg/m² of body surface per week). Kids of the second group (n = 29) received nonsteroidal anti-inflammatory drugs monotherapy. The monitoring of pain syndrome during treatment showed significant reduction of pain intensity in the first group only. Children felt decrease joint pain 2 years after the date of initiation a low-dose of methotrexate (4.1 ± 0.4 cm, 1.6 ± 0.3 cm; p < 0.05). However parents indicated that the level of pain decreased already one year after conducted basic treatment (4.3 ± 0.4 cm, 3.3 ± 0.3 cm; p < 0.05).
In some foreign studies were conducted a comparative analysis of the results of the use of parents and their children. S.D. Lal et al. have shown that the results of the evaluation of pain perception between parents and children coincide in 71% of cases [1]. In the articles of P. Garcia–Munitis and others, G.J. Reid et al. were shown that parents very often underestimate the value of children’s pain [2, 3]. In our study we obtained the opposite results. Calculation of the coefficient of diagnostic value by the Zemskov formula showed equally informative results of pain perception assessed by sick JRA patients and their parents (Ki = 3.41 in both cases).

**Conclusion.** The results help to conclude that in Ukraine parents interested in their children’s well-being and well informed in their real state of health. If necessary the results of evaluation of pain in patients and their parents with help of VAS can be interchangeable.

**References**


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**Age-Dependent Differences in Static Bone Electrogenesis**

**Introduction.** The relevance of the research. Bioelectric properties of bone tissue are determined by static and dynamic electrogenesis. Static electrogenesis is causing slowly time-varying electric potentials (EP) in bones which include potentials of resting, growth and regeneration [1, 2].

The aim of this study was to examine age-dependent differences in values and distribution of the EP on the periosteal surface of the femur of young and old rats.

**Materials and methods.** Studies were performed using 42 male Wistar rats at the age from 1 to 24 months. Freshly isolated femurs obtained from the pre-anesthetized and decapitated animals served as materials for the study. Femurs were skeletonized and immersed in sodium chloride 0.9% solution. Measurement of EP was performed on electrophysiological device [3]. Ag–AgCl electrodes with agar salt bridges were used in the studies. While measuring, the reference electrode was placed on the distal epiphysis of femur and the measuring electrode was moved along the periosteal surface of bone using a micromanipulator. The measuring electrode was fixed in the following anatomical and topographical areas of the femur: the distal epiphyseal-metaphyseal, the distal metaphyseal-diaphyseal, the center of diaphysis, the proximal metaphyseal-diaphyseal and the proximal epiphyseal-metaphyseal.

**Results.** The negative polarity electric potentials were recorded on the periosteal surface of the rats’ femur. Their absolute values ranged from –0.1... 0.2 to –2.0... –3.0 mV. The distribution of the electric potential magnitude on the bone surface of young and old rats had general patterns. At all ages the maximum values of EP were recorded in epiphyseal-metaphyseal growth plate, and the minimum — in the center of diaphysis. However, the value of EP for older rats was significantly lower than for young ones. It was typical for all anatomical and topographical areas of the femur. The maximum value of the negative potential reached up to –2.96 ± 0.50 mV among 1–2-month old rats. The values of the EP were –2.60 ± 0.22 mV among 3–4-month old rats, and at the age of 14–15 months — 0.61 ± 0.19 mV. The maximum values of the EP did not exceed –0.30 ± 0.09 mV among 18–19-month old rats, and –0.20 ± 0.05 mV among 22–24-month old ones. The most expressed age-dependent differences in the EP magnitude were typical for the epiphyseal-metaphyseal growth plate. It is known that this area of growing bone has the highest rate of metabolic processes. The values of EP in bones epiphyseal plates decreased after their closure among older rats. But it remained higher than in other parts of the femur as a rule.

The maximum differences in the magnitude of EP have reached up to –2.51 mV among young rats, whereas they did not exceed –0.32 mV among old ones. The degree of individual variability values of EP decreased with age. The differences in the EP magnitude in separate regions on the bone surface are also decreased. The maximum dispersion of EP within the group reached up to 1.99–1.85 for young rats. But it was only 0.47 among 14–15-month rats and not more than 0.09–0.06 for old rats.

**Conclusion.** The effectiveness of static electrogene- sis among rats reduces with age. It appeared in decreasing of the EP values on the periosteal bone surface. Differences in the values and distribution of slowly time-varying electric potentials among young and old rats reflected the age-dependent changes in metabolic activity and states of the physiological remodeling processes in bone tissue.

**References**


The results of the study. In the analysis of the questionnaires established the following. The active lifestyle, including the exercise, were 46.67 % of the women; abused the coffee and carbonated drinks — 47.04 %, smoking — 40.00 % of the women. Menarche occurred before the age of 12 years at 13.70 %, later becoming the menstrual cycle was observed in 7.41 %.

In the 53.33 % of the women had of the one birth, at 33.33 % — 2, at 6.67 % — 3 birth, did not give birth at all 6.67 % of women. At 6.67 % of the women had no one birth.

Every fifth the patient (18.15 %) were of the reproductive organs chronic inflammatory diseases, one in ten (12.22 %) had the pathology of the cervix (pseudoeosin, cervicitis).

On the gastrointestinal diseases identified 15.93 % of the women, of the kidneys — 12.96 %, rheumatoid arthritis — 7.78 %, hyperthyroidism — 7.04 %, diabetes — 7.41 % of the women. Only 7.04 % of the premenopausal women had no somatic and gynecological diseases.

According to the ultrasound densitometry, parameters of the bone mineral density were normal in only 54.16 % (319) of the women, osteopenia was found in 42.78 % (252) and at the 3.06 % (18) women osteoporosis diagnosed.

The indicators of the standard deviation of the age bone mass (Z-criterion) in the women with the osteopenia was —1.48 ± 0.22 SD, with the osteoporosis — —2.62 ± 0.06 SD.

Conclusion. Only 7 % of the premenopausal women in one district of the Odessa city have chronic diseases; the most frequently reported diseases of the gastrointestinal tract (15.93 %), kidney disease (12.96 %), and 7 % of the women suffer from rheumatoid arthritis, hyperthyroidism, diabetes mellitus. Every third of the premenopausal woman (30.37 %) are diseases of the reproductive sphere. In addition, almost half of the women abused coffee, smoke.

Every second of the premenopausal women (45.84 %) revealed the osteopenia, 3.06 % in the parameters of the bone mineral density evidence of osteoporosis.
Results. It was revealed that with increasing severity of disease and patient’s age COPD inflammation activity increases with increasing levels of markers of systemic inflammation. It has been determined significant inverse correlations between markers of systemic inflammation and bone formation, and direct correlations between markers of bone resorption, which confirm the adverse effect of active inflammation in the metabolic processes in the bone tissue. It has been determined significant (p < 0.05) negative correlation between COPD stage and axial skeleton BMD of the lumbar spine (r = –0.80), radius (r = –0.73), femur (r = –0.75), all skeletal sites (r = –0.73); trunk (r = –0.71); pelvis (r = –0.71); limbs (r = –0.62).

We determined the frequency of osteopenic syndrome, osteoporosis and osteoporotic fractures in COPD patients according to age, sex, severity and duration of illness. Risk factors of osteoporosis for patients with chronic obstructive pulmonary disease were also determined. A lumbar spine was found the most vulnerable area for osteoporosis in COPD patients, as evidenced by a significant decrease of bone mineral density in this area in patients with at least stage II of the disease.

Conclusions. We developed an algorithm of COPD patients’ supervision that served as a basis for reducing a period of diagnostic process and definition of ultimate risk group in terms of development of systemic osteoporosis and its complications. The particular attention should be paid to such osteoporosis risk factors as severity of bronchial obstruction, low BMI values, smoking experience and age of COPD patients as the most important ones.

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Injury of Musculoskeletal System in Young Patients with Undifferentiated Connective Tissue Dysplasia

Introduction. Problem of undifferentiated connective tissue dysplasia (UCTD) as pathology of collagen, is a significant problem of modern medicine because of the high prevalence, multiorgans injury and serious effects. Congenital defects of connective tissue can be diagnosed at the stage of physical examination of the patient at combined rating of phenotypic markers. Thus, a big numbers of external markers of dysplasia are found at UCTD. Prevalence of some external phenotypes according to various sources is extremely high: single external markers detected in 94% of young people, numerous (more than 6 features) ones are found in 42% of patients. The most studied and dangerous for the complications at the syndrome of UCTD is idiopathic mitral valve prolapse (MVP), which often occurred with cardiac arrhythmias. At the same time, injury of the thoracic spine at UCTD causes to arrhythmic complications of vertebrogenic character.

The aim of our study was to find external (phenotypic) markers of UCTD from the side of musculoskeletal system in patients with idiopathic MVP and detect prognostically important parameters for further formation of risk groups.

Materials and methods. We examined 120 patients of age 16 to 35 years with idiopathic MVP (average age — 25.1 ± 0.4 years). All patients had a complex clinical and instrumental examination (general clinical, biochemical, ECG, Holter ECG monitoring, Doppler echocardiographic examination, X-ray examination). Somatometric examination of the patients conducted by the method of V.V. Bunaka (1939, 1941) in modification of P.P. Shaparenko (1989).

Results. By the study results 100% of patients had the skeletal system injury regardless of the degree of MVP. However, the evidences of a musculoskeletal system injury differed depending on the degree of MVP. Thus, the phenotypic markers of the spine (scoliotic curvature, kyphoscoliosis, straight back and hallowed chest) significantly more often detected in patients with II degree of MVP (p < 0.05). Phenotypic stigmas of the upper and lower extremities (short and crooked little finger, “like sandal” cleft foot, flat feet, dolichostenomelia) were founded in the same number of patients regardless of the degree of MVP (64.1%). Changes of the oral cavity (abnormalities of dentition structure, high palate) were found in 52.1% of patients with idiopathic MVP. Hypo- trophy (61.4%) often was observed among stigmas muscle in patients with idiopathic mitral valve prolapse, incidence of which was increased significantly with the degree of MVP (p < 0.05).

Cardiac rhythm disorder was observed in 51 patients (42.5%). Supraventricular extrasystole, sinus tachycardia, ventricular arrhythmia dominated among the patients with I degree of MVP. Supraventricular extrasystole, paroxysmal supraventricular tachycardia, ventricular extrasystole, sinus tachycardia, fibrillation were registered in patients with II—III degree of MVP more often. Correlation analysis revealed a strong direct connection between the degree of MVP and the numbers of musculoskeletal stigmas (r = +0.72). Risk assessment in the form of calculating the odds ratio (OR) in patients with II—III
degree of MVP showed that the probability of arrhythmic disorders they may have in 6.3 times higher than in patients with I degree of MVP (OR = 6.3). On this base we select the group of patients with high risk of arrhythmic complications of idiopathic MVP: young men with II—III degree of MVP and the presence of 4 or more musculoskeletal dysembriogenesis stigmas.

Conclusions. Thus, UCTD syndrome is a unique abnormal background for the existence of various clinical conditions with a wide range of symptoms. Early detection and correction of phenotypic markers of UCTD from the side of the musculoskeletal system will improve the quality of life of such patients and reduce possibility of disability in a future.

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Using of Lovastatin Nanoparticles for the Osteoporosis Treatment and Fracture Risk Reduction (Experimental Study)

Introduction. A new published experimental data and clinical studies demonstrate the ability of lovastatin to affect osteoregeneration. This effect of statins is realized through the increased expression of bone morphogenetic protein 2. However, current studies on the possibility of statins to reduce the risk of fractures are controversial. The positive effect of statins on bone metabolism was observed with oral administration of these drugs but in very high doses. That is why it is so important to develop the new ways of statins delivering to fracture zones, particularly in the form of nanoparticles.

Aim. To investigate the possibility of using lovastatin in nanoparticles to restore posttraumatic bone defects in rats.

Materials and methods. White mature male rats (n = 168) were used in experiment. All animals were divided into four groups: I — intact animals, II — control group (animals with simulated bone defect), III — animals with bone defect, which were administered with lovastatin transdermally, IV — animals with bone defect treated with lovastatin incorporated into polymeric nanoparticles. The bone defect (2.0 mm in diameter) was made by dental drill in the upper third of the tibia. The III group of animals received lovastatin in doses 0.1, 1.0, 5.0 mg/kg during the whole period of experiment. The IV group of rats was injected with lovastatin incorporated into polymeric nanoparticles directly into the fracture zones in a dose 1.0 mg/kg. The animals were decapitated on the 3rd, 7th, 14th and 28th day. Biochemical (activity of alkaline and acid phosphatases, mineralization index, collagenolytic activity of plasma, oxyproline Ca and P levels in plasma), radiographic, histological, and statistical methods were used in the study.

Results. Our results showed a positive effect of transdermal administration of lovastatin only in dose 5 mg/kg, which is significantly higher than the average therapeutic dose. There was no effect of transdermal applying of lovastatin in dose 0.1 and 1.0 mg/kg. At the same time the using of lovastatin incorporated into polymeric nanoparticles resulted in a significant decrease of the bone resorption symptoms on the 3rd and 7th day of the experiment, which was confirmed by the biochemical markers and histological examination. Using of incorporated into polymeric nanoparticles lovastatin also resulted in the strengthening of osteoregeneration on the 14th day of experiment and resumption of posttraumatic bone defect on the 28th day.

Conclusion. In our studies we have shown that the incorporated into polymeric nanoparticles lovastatin induces posttraumatic osteoregeneration. The obtained results require further extensive research in this area.

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Hypovitaminosis D in Autoimmune Thyroiditis Patients with Subclinical and Overt Hypothyroidism

Introduction. There is increasing interest in the role of vitamin D deficiency in a number of chronic health problems including autoimmune diseases. A number of factors have been implicated in pathogenesis of most autoimmune disorders, one of the most recent agents found to be associated with autoimmunity is vitamin 25(OH)D. Serum 25(OH)D, the most abundant circulating precursor of active vitamin D, is the most widely accepted indicator of vitamin D status and reflects combined contributions from cutaneous synthesis. Importantly, both vitamin D and thyroid hormone bind to similar receptors called steroid hormone receptors. A different gene in the vitamin D receptor was shown to predispose people to autoimmune thyroid disease including Graves’ disease and Hashimoto’s thyroiditis.

Aim: to investigate the total vitamin 25(OH)D in 70 autoimmune thyroiditis patients with subclinical (n = 21) and overt (n = 49) hypothyroidism.

Material and methods. 70 patients and 20 apparently healthy individuals with matched age and sex were underwent a detailed clinical examination, thyroid function tests (TSH, fT4, fT3, thyroid peroxidase antibodies) and serum total vitamin 25(OH)D. They were living in Kolomyja region and recruiting to outpatient clinic of Central Regional Hospital during the period from September 2013 to July 2014. Written consent was taken from all participants in this study. They were classified into three main groups: Group I. Patients with autoimmune thyroiditis and subclinical hypothyroidism. It included 21 patients (3 male (14.3 %) and 18 female (85.7 %)), their mean ages 46.36 ± 2.84 years. They were
Patients with Osteoarthritis in Prognosis of Osteoporosis in Young Allelic Polymorphism of FDPS Gene

Introduction. The occurrence of osteoarthritis (OA) in young people in most cases is the result of injuries (more often sports) or overweight. Also, one of the concepts of development is cell activation, which is accompanied by an increased destruction of cartilage and decreased of matrix synthesis. Cytokines and growth factors influence on chondrocytes through specific signaling pathways that regulate the synthesis of matrix metalloproteinases. Changes in chondrocytes can disrupt the processes of differentiation and lead to the synthesis of matrix cartilage is not enough high quality. A possible next step of the progression OA is the formation of osteoporosis (OP). One of the ways of OP development may be genetic deviation of the FDPS gene. Diphosphates, which structure includes nitrogen, are inhibitors of the enzyme FDPS, which plays a significant role in the synthesis of cholesterol and triggers apoptosis of osteoblasts. Changes in the given gene provoke decrease in bone mass and bone density.

Aim: To determine the frequency of pathological mutations of the FDPS gene in patients with osteoarthritis as a marker of the formation of osteoporosis.

Materials and methods. We examined 32 patients with OA at the age of 21 to 39 years and disease duration from 2 to 17 years. In 15 cases, it was preceded by the appearance of chronic rheumatism of the lower limbs (athletes), in 9 cases, it developed against the background of obesity 2–3 stage. All patients underwent clinical, radiological and densitometric study. DNA diagnostics were studied in blood leukocytes, which included a study of the insertion-deletion polymorphism of FDPS gene — method of polymerase chain reaction with using a diagnostic test systems SNP-Express ACE Alu Ins/Del (Liteh, Russia).

The control group included 50 practically healthy persons of similar age and sex.

Results. The study showed that in 9 cases OA changes at densitometric study has not been identified; 11 patients (34.4 %) were diagnosed with osteopenia and 12 (37.5 %) — osteoporosis of different severity. In the study of polymorphism of FDPS gene was found that in patients with normal densitometry genotype A/A was found in 5 cases (55.6 %), genotype A/C was identified in 3 patients (33.3 %) and pathological C/C genotype in 1 (11.1 %). In the group of patients with osteopenia and OA — normal genotype was found in 2 cases (18.2 %); genotype A/C in 6 patients (54.5 %) and pathological genotype (C/C) of the FDPS gene in 3 patients (27.3 %). In the group of patients with OP has increased frequency of pathological mutations (C/C genotype) to 66.7 % (8 patients); and genotype A/C was set at 4 patients (33.3 %). In studying of the prevalence of the FDPS gene of the healthy patients were received the following results: A/A genotype was recorded in 68 % (34 patients), A/C — in 24 % (12) and C/C — 8 % (4 patients).

Thus, patients with OA and osteopenia in 3.4 times frequently were recorded pathological mutation of FDPS gene in comparison with those of the control group. In patients with OA and osteoporosis this indicator was in 8.3 times higher.

Conclusion. In young patients with OA often determined violation of the structure of bone tissue, leading to the formation of osteopenia (11 patients — 34.4 %) or osteoporosis (12 — 37.5 %). Development of such changes in bone tissue occurs against pathological mutation of the FDPS gene (genotype C/C).

Thus, the study variants of the FDPS gene in patients with OA can be used as a marker for the formation of osteoporosis, which allows to develop measures for its prevention.
The aim of the research is to conduct a comparative assessment of pain in women with osteoarthritis in combination with hypertension.

Materials and methods. 31 postmenopausal women (average age 61.1 ± 1.2 years, menopause duration 5.4 ± 2.2 years) were examined. All respondents were divided into two groups: group I comprised 13 patients diagnosed with osteoarthritis (gonarthritis) Roentgen phase II according to classification of Kellgren & Lawrence (1957), group II comprised 18 patients with gonarthritis of stage II in combination with hypertension of the second degree. Pain syndrome was assessed with the usage of verbal analogue scale (VAS) and the scale of WOMAC. All patients were taken Ultrasound densitometry (BUA, SOS, stiffness index, T-score) with the Lunar Achilles device (Lunar Corporation, Madison, Wisc., USA). Laboratory data included total serum calcium, PTH, vitamin D.

Results. All women surveyed revealed osteopenia, the severity of which is not dependent on the degree of hypertensive. Pain intensity on VAS was significantly higher in patients with osteoarthritis, combined with hypertension compared to patients with osteoarthritis (60.5 ± 2.3 mm and 51.2 ± 1.2 mm respectively, p < 0.05). Evaluation of functional impairment score WOMAC revealed significantly greater stiffness in patients with morbidity compared with osteoarthritis (70.3 ± 3.2 and 52.5 ± 2.1 respectively, p < 0.05). Also the greatest severity of functional impairment observed in group II compared with the first group (60.5 ± 1.2 and 52.5 ± 2.1 respectively, p < 0.05). Patients of group II were identified to have secondary hyperparathyroidism and vitamin D deficiency (21.99 ± 1.20 nmol/l) probably caused by the D-hormone-deficiency taking into consideration the increase in serum creatinine and decreased creatinine clearance in this group.

Conclusion. Thus, the more intense the pain and functional impairment in patients of group II were seen against the background of the identified secondary hyperparathyroidism and vitamin D deficiency probably caused by the D-hormone-deficiency taking into consideration the increase in serum creatinine and decreased creatinine clearance in this group. Secondary hyperparathyroidism enhances bone resorption and exacerbates pain due to the development of osteomalacia. It indicates the necessity to use the active metabolite of vitamin D (alfacalcidol) to correct the violations.

Aim. To study changes in bone metabolism in fractures of trochanteric area of the femur in patients with type 2 diabetes.

Materials and methods. In the period since 2012 to 2015 were examined 42 patients who were hospitalized in the clinic at the department of general surgery UzhNU about fractures of the trochanteric area of the femur. There were 34 injured women, men — 8. Age composition ranged from 48 to 79 years, average age — 67 years. Before trauma patients had active lifestyle.

The main group consisted of 19 patients with type 2 diabetes. Body mass index (BMI) was 29.4 (25.7–34.2) kg/m², level of glycosylated hemoglobin (HbA1c) — 9.6 (7.7–11.3) %. Part of patients (n = 13) took sulfonylurea drugs 10.5 (7–10.5) mg/day, metformin — 1.5 (1–1.5) g/day, and other (n = 5) received combined treatment with insulin. The average duration of the disease diabetes was 8 years old. Newly diagnosed diabetes was 1 case, in 4 patients disease duration was less than 5 years, 7 patients — from 5 to 10 years, 7 patients — more than 10 years. Among the complications of diabetes was more frequent diabetic micro and macro angiopathy limbs — 9 people, diabetic retinopathy — 5 people, diabetic neuropathy — 4 people. Cardiovascular diseases were observed in 13 people.

The control group consisted of 23 patients with fractures of the trochanteric area of the femur in which rates of sugar of blood serum and glycated hemoglobin does not exceed the norm. BMI was 28.9 (25.3–33.9) kg/m². Both groups were comparable in age, sex, severity of the fractures of the trochanteric area of the femur. There were vascular diseases observed in 13 people.
The Influence of Sartans on the Gout Course

Introduction. Modern science considers the level of uric acid as a risk factor for cardiovascular pathology. Hyperuricemia is the basis for the gout development. The doubled increase in number of gout cases and related complications in the last decade requires finding new aspects of pathogenesis and treatment approaches. Today, the largest percentage of use as antihypertensive agents in the world belongs to sartans group. Special place among numerous of sartans pleiotropic properties belongs to uricosuric effect of this group of drugs. Multicenter trials that investigated the influence of sartans on the course of arterial hypertension, only stated their influence on the level of uric acid in the blood. But, there is no evidence of sartans influence on the gout course.

Aim. To study the influence of sartans on the gout course.

Materials and methods. During the years of 2013–2014, we have examined 63 of male patients suffered from gout. Patients were randomized into two groups: the first consisted of patients (30 people) who took convention-al treatment of gout, the second one (33 people) — those, who took sartans as a part of comprehensive treatment of this disease. The average duration of sartans use for group II of patients was 8.3 ± 0.7 months. Both groups were representative by age, level of uric acid, hyperlipidemia before the treatment, the level of process activity, the number of injured joints as follows: monoarthritis of traditional localiza-

general condition and the nature and methods of fracture surgery.

On all patients were performed laboratory and instrumental clinical study determined the level of calcium, phosphorus, hydroxyvitamin 25(OH)D, alkaline phosphatase, parathyroid hormone (PTH) and osteocalcin.

To determine BMD ultrasonic densitometry was performed in three standard parts of the skeleton (lumbar, proximal femur, forearm). Were estimated bone mineral density L1-L4 spine, proximal femur and distal forearm. BMD assessment was performed according to WHO recommendations. Z- and T-criteria. In women during menopause and men over 50 years using T-test data in accordance with the interpretation of densitometric WHO classification (rate from 2.5 to 1, osteopenia from −1 to −2.5, osteoporosis from −2.5 SD and below).

Results and discussion. In people with diabetes type 2 breach phosphorous-calcium balance may be at different stages of the disease, and many researchers indicate normal or slightly reduced levels of calcium and phosphorus in the blood of patients, which coincides with our data. In the experimental group levels of calcium was 2.13 ± 0.03 mmol/l, and phosphorus — 1.05 ± 0.04 mmol/l. In the control group levels of calcium was 2.37 ± 0.03 mmol/l, and phosphorus — 1.28 ± 0.04 mmol/l. The same applies to hydroxyvitamin 25(OH)D, the level of which was in the normal range in both groups. Alkaline phosphates’ level in the control group was 156.30 ± 0.04 IU/l. In the experimental group levels of calcium was 2.13 ± 0.03 mmol/l, and phosphorus — 1.05 ± 0.04 mmol/l. In the control group was 156.30 ± 0.04 IU/l.

Important role in the regulation of bone formation and osteoreparation pay parathyroid hormone. In the experimental group was marked higher levels of parathyroid hormone than in the control group, and was 58.08 ± 2.70 pg/ml and 41.55 ± 1.90 pg/ml, respectively.

Nowadays it is admitted that the most informative indicator of bone growth is the level of osteocalcin, which is synthesized by osteoblasts. In patients with type 2 diabetes osteocalcin level was 19.92 ± 0.80 ng/ml, in control group — 32.87 ± 0.90 ng/ml.

In the study of data of densitometry in three locations (lumbar, proximal femur, forearm) reduction in bone mass (T < −1) detected in most patients, with those in the experimental group it was more pronounced than in the control group. In the experimental group prevailed patients with a diagnosis of osteoporosis (T < −2.5) in the control group prevailed patients with osteopenia.

When comparing the densitometric measurements in three standard points were observed that in the experimental group osteopenic syndrome most often seen in the proximal femur (78.9 %), whereas in the control group were most pronounced changes in the lumbar spine (73.9 %).

Conclusion. The severity and duration of type 2 diabetes affect the bone metabolism and cause leakage osteoreparation in patients with fractures of the trochanteric area of the femur through changes in mineral and hormone balance.

The possibility of less reversible changes in bone tissue on a background of type 2 diabetes poses the need to address the issue of early diagnosis and treatment of abuse of bone metabolism in this group of patients.

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Nowadays it is admitted that the most informative indicator of bone growth is the level of osteocalcin, which is synthesized by osteoblasts. In patients with type 2 diabetes osteocalcin level was 19.92 ± 0.80 ng/ml, in control group — 32.87 ± 0.90 ng/ml.

In the study of data of densitometry in three locations (lumbar, proximal femur, forearm) reduction in bone mass (T < −1) detected in most patients, with those in the experimental group it was more pronounced than in the control group. In the experimental group prevailed patients with a diagnosis of osteoporosis (T < −2.5) in the control group prevailed patients with osteopenia.

When comparing the densitometric measurements in three standard points were observed that in the experimental group osteopenic syndrome most often seen in the proximal femur (78.9 %), whereas in the control group were most pronounced changes in the lumbar spine (73.9 %).

Conclusion. The severity and duration of type 2 diabetes affect the bone metabolism and cause leakage osteoreparation in patients with fractures of the trochanteric area of the femur through changes in mineral and hormone balance.

The possibility of less reversible changes in bone tissue on a background of type 2 diabetes poses the need to address the issue of early diagnosis and treatment of abuse of bone metabolism in this group of patients.

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Lymphoma Chemotherapy as a Possible Consequence of Hodgkin's Lymphoma

Introduction. Four adult patients with malignant Hodgkin's lymphoma were treated with combination chemotherapy including an alkylating agent and intermittent high-dose prednisone (in two cases). Twelve to 24 months after initiation of therapy, osteonecrosis of the femoral head developed. This was unilateral in all cases, and presumably didn’t represent a complication of steroid administration, as two of the patients received 4 and 6 month of corticosteroids therapy. Necrosis of bone may be a low-frequency long-term complication of combination chemotherapy in lymphoma.

Administration of corticosteroids is known to be associated with the development of osteonecrosis, or avascular necrosis of bone, particularly of the femoral and humeral heads. In the main, this occurs in patients receiving doses in excess of physiologic replacement for prolonged periods of time. In recent years, increasing numbers of patients with malignant Hodgkin's lymphoma have been treated intermittently with combinations of chemotherapeutic agents, including corticosteroids.

Materials and methods. From 2009 through 2014, 283 patients were treated with chemotherapeutic regimens involving a combination of drugs for advanced Hodgkin's disease. Virtually all the patients were adults. The treatment programs consisted of intermittent administration of such schemes of chemotherapy as ABVD and BEACOPP. Drug dosages and scheduling have been described in detail elsewhere, but the BEACOPP combination includes the administration of 2 weeks of daily oral prednisone, 40 mg/m² body surface area for 4–6 month. All charts of these lymphoma patients in whom a diagnosis of aseptic or avascular necrosis of bone had been recorded (two patients both ABVD and BEACOPP) were reviewed for this report. In all instances the bone abnormality involved the femoral head and developed after initiation of chemotherapy. The diagnoses were made by radiographic means, using standard criteria, and operative intervention has been required and performed in all these patients.

Conclusion and discussion. Several theories have been proposed to account for an increased incidence of osteonecrosis after combined chemotherapy administration. Vascular obstruction by fatty emboli in areas of bone with poor collateral circulation is a mechanism that is often discussed, and both clinical and experimental supporting evidence have been described. These findings have not been confirmed by others, however, microtrauma in osteoporotic bone, possibly exacerbated by diminished sensitivity from the antiinflammatory effects of steroids is among other suggested etiologic factors. Avascular necrosis of bone has complicated the treatment of a variety of diseases, including many in which this lesion is not part of the natural history of the disease. To our knowledge, osteonecrosis has previously been reported in the course of intermittent corticosteroid therapy of lymphoma, as well as in untreated lymphoma among the conditions associated with development of avascular necrosis of the femoral head. Steroids were administered to two of our patients for relatively long periods of time. In some reviews of the problem of aseptic necrosis complicating steroid therapy, the time from initiation of treatment to development of necrosis is stated to vary from 6 to 54 months. Daily prednisone dosage in most patients was 10–90 mg. Such articles point out that total steroid dose, daily dose, and duration of drug administration associated with osteonecrosis may be minimal. The possibility that our patients suffered from idiopathic necrosis of the femoral head should also...
be considered. This disease is reported to be rare but some authors think recognition of the entity is increasing. An increased incidence of the male sex, minor trauma, alcoholism, and hyperuricemia has been described in «idiopathic» cases. At least one of the latter three factors was questionably in all of our four patients. The importance, if any, in the development of bone necrosis of the cytotoxic drugs — an alkylating agent and vincristine in all instances, and procarbazine in two-administered to our patients — is yet unknown. We have assumed unlikely that the femoral head necrosis in our patients is related to the high dose but intermittent prednisone given in the combination chemotherapy protocols utilized in treatment of lymphoma. As the frequency of remission induction and disease-free survival of these patients improved long-term complications of intensive chemotherapy have become apparent. Osteonecrosis in a small percentage of intensively treated cases may be among these complications. And etiologic relationship of the corticosteroids to bone disease in such patients is uncertain.

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Changes in Bone Mineral Density of the Distal Forearm and Development of Erosive Joint Damage at Hand Joints MRI in Patients with Early Rheumatoid Arthritis

**Introduction.** Changes for better prognosis in rheumatoid arthritis (RA) much depend on the beginning of an adequate basic treatment for early, non-erosive stage disease (no later than 3 months after the start of the articular syndrome) as a new therapeutic paradigm involves the diagnosis of RA in the most initial stages of the disease. Newest methods of X-ray diagnosis of lesions of bones and joints allow using of a number of modern techniques for early diagnosis of rheumatoid arthritis, defining the degree of destructive changes and assessing of the progression of the disease. The introduction into clinical practice of MRI significantly enhanced the diagnosis of inflammatory changes of a wrist joint and a hand. Currently, the issues of early visualizing of the changes in the joints and bone which can be used as predictors of future joints structural damage are being discussed.

**Aim.** To assess changes in the bone mineral density (BMD) in patients with early rheumatoid arthritis (ERA) and how the BMD is related to the erosive changes of the wrist on MRI.

**Methods.** The study involved 112 patients with early rheumatoid arthritis (ERA) who had suffered of articular syndrome for 1 year (average 10.6 ± 2.2 months). The diagnosis was established against the RA classification criteria EULAR/ARC 2010. Mean age of the patients was 44.8 ± 7.4 years. Clinical and laboratory studies were included: rheumatologist examination, DAS28 test, ESR, concentrations of rheumatoid factor (RF) test, anti-cyclic citrullinated peptide (anti-CCP) and anti-modified citrullinated vimentin (anti-CMV) tests. Bone mineral density (BMD) of the distal radius and lumbar spine (L1-L4) were assessed by DEXA Challenger (DMS, France). MRIs of the patient’s dominant wrist and 2nd — 5th metacarpophalangeal (MCP) joints were obtained using 1.5T MRI MAGNETOM Espree (Siemens) with contrast enhancement. The average score was determined for synovitis (0—9 for wrist joint, and 0—21 for wrist plus MCP joints), bone oedema (osteoitis, 0—69) and bone erosions (0–230) using the RAMRIS system. Statistical analysis of the results was also undertaken.

**Results.** The DEXA showed bone loss in patients with ERA. When analyzing the lumbar spine osteoporosis was found in 8 patients (7.14 %) and osteopenic syndrome was identified in 33 patients (29.4 %). In the study of the distal radius the more substantial bone loss was established. Thus, osteoporosis was diagnosed in 29 patients (25.9 %), osteopenic syndrome — in 67 patients (59.8 %). The BMD decrease at the distal radius correlated with DAS28 (r = –0.67; p < 0.001), ESR (r = –0.44; p < 0.05) and number of swollen joints (r = –0.40; p < 0.01). As for BMD of the lumbar spine, only the correlation with DAS28 was found. Osteopenia and osteoporosis were more frequently identified in patients with RF (+), anti-CCP (+) and ant-CMV (+). All patients with seropositive rheumatoid arthritis showed a significant decrease in bone mineral density at both the lumbar spine and distal radius. Bone erosions were identified with standard radiography in 28 patients. Most of the erosions were located in the bones of the wrist and in 7 patients they were located in the head section of metacarpal bones. vDHs system demonstrated the score of 15.0 ± 24.6 points of average erosions. Detection of erosions on radiographs correlated with the presence of synovitis hand joints. At the same time all patients with radiographic erosions suffered of the decrease in BMD of the distal radius (r = –0.72; p < 0.001). However, assessment of the changes in mineral density of the lumbar spine did not demonstrate such correlation. MRI of the dominant wrist revealed the following MR symptoms: swelling of the bone marrow — in 102 patients (91.07 %), synovitis — in 86 patients (76.8 %), erosion — in 71 patients (63.4 %). MRI detected the erosions 2.5 times more cases than the standard radiography. Strong correlation between BMD of the distal radius and the presence of erosions detected by MRI (r = –0.72; p < 0.001), and lumbar spine BMD and erosions (r = –0.48; p < 0.01) was established.

**Conclusion.** The results of this study prove that the decrease in BMD of the distal radius and lumbar spine correlates with the erosions of the dominant wrist and 2nd — 5th MCP joints detected by standard radiographs and MRI. Thus, the BMD changes can be predicted early by the development of erosive process in patients with ERA. The early loss of a wrist bone tissues, measured in the first year of the disease using the DRA is an independent predictor of erosive progression.
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Manifestations of Genetically Determined Conditions Depending on the Degrees of Exogamy

Introduction. A tendency of increasing of undifferentiated connective tissue dysplasia syndrome (UCTDS) cases in children has been occurring lately. A significant attention to this pathology is associated with lesions of organs and systems, clinical polymorphism and late diagnosis. There are different scientific facts on the causes of UCTDS formation in children, which indicate the multifactorial nature of the disease. The role of the genetic factor in development of UCTDS in children is studied in our research. It is known that the rise of genetic anomaly is possible in the presence of genetically related material of the parents of a child. The genetic medical history was investigated; it allowed to identify the susceptibility for growth delay depending on the degree of exogamy that was based on marriage of children’s parents who had medical examination. Three degrees of exogamy were distinguished: I degree — parents are from one village or different villages, which are distant from each other no more than 30 km; II degree — parents are from different population centers within the same region or the same city; III degree — parents are from different regions.

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Structural Analysis of Bone Tissue Lumbar Spine in Patients with Chronic Lymphoid Leukemia and Possible Ways to Correct

Introduction. Modern chemotherapy and immunotherapy of chronic lymphoid leukemia (CLL) has increased the overall survival of patients, so the question of the quality of life is particularly relevant. It’s not actually studied the prevalence of secondary osteoporotic lesions (OL) of bone tissue (BT) at patients with CLL in different age groups and therefore there is no scientific basis of depending on the state of BT on age, sex and stage of lymphoproliferative process and methods of chemotherapy treatment that prevents timely diagnosis of osteoporotic (OP) and osteopenic changes BT at this category of patients and their adequate medical treatment and prevention.

Identify the major factors of modification BT at patients with CLL, depending on age, sex and stage lymphoproliferative process and methods of chemotherapy treatment that prevents timely diagnosis of osteoporotic (OP) and osteopenic changes BT at this category of patients and their adequate medical treatment and prevention.

To analyze the influence of exogamy degree we have chosen a syndrome which may be diagnosed by the objective examination of the child; it is connective tissue dysplasia syndrome with hypermobility of joints. 64 children of school age were examined to identify the dependence of their health condition from the degrees of exogamy. The following degrees of exogamy were distributed during medical examination: I degree was found in 40 children, II degree was detected in 11 children and III degree was revealed in 9 children. UCTDS was exposed depending on the degree of exogamy in the following children: I degree — 11 children (27.5 %), II degree — 2 children (18.2 %), III degree — 0 children (0 %). UCTDS was manifested in 4 children more, but these indicators were not taken into consideration due to the absence of information about their parents. The inverse average correlation connection between UCTDS and degree of exogamy ($r = -0.36, p < 0.05$) was showed and it confirmed the genetic component of UCTDS etiology. In addition to complexes of the UCTDS phenotype signs, every child with I exogamy degree had signs of some dysfunctions of different organs and systems. Some disturbances were functional (the presence of gallbladder deformations of different configurations), others had a morphological character (little anomalies of heart, scoliosis and flat-foot disease). Therefore, we can suppose the dependence of connective tissue dysplasia syndrome from exogamy degree, i.e. the genetic factor in etiology of UCTDS. This syndrome is a background pathology, and it is manifested by phenotype and changes in organs and systems of the human body.

There were clinically tested the treatment programs for the correction of reduced bone mineral density at patients with CLL: 1) treatment program number 1 with usage of the integrated product Calcium-D3, Nycomed; 2) treatment program number 2 using the drug Ostalon; 3) treatment program number 3 with the drug Bivalos.

Treatment regimens due to the presence of osteopenia and OP changes BT LS surveyed 57 patients (37 women, 20 men) with CLL. The choice of treatment options depend on the depth of osteopenic changes BT identified by two-photon absorptiometry, and indications and contraindications to pharmacological stimulants.

Using the method of evaluation of clinical efficacy of medical facilities two groups of criteria were selected: 1) the state of BT LLS, which was assessed by BMD, total content of minerals and calcium BT LS; 2) changes of the general condition of patients (on a scale Karnofsky and impact on quality of life — in the main questionnaire EORTC QLQ-C30).

The drug Calcium-D3, Nycomed was appointed to 9 women aged 47 to 83 years old (middle age 64.00 ± 3.94 years), duration of menopause from 0 to 27 years (middle duration of menopause 10.44 ± 3.18), CLL duration from 1 to 108 months (average length of 42.00 ± 12.30) and disease stage B and C for 4 months and 16 men aged 48 to 85 years (mean age 65.38 ± 2.89 years) with duration CLL from 0 to 132 months (average length of 37.44 ± 9.28 months) for 4 months at a dose of 1,000 mg per day.
The drug Ostalon was appointed to 11 women aged 53 to 79 years (middle age 67.82 ± 2.71 years), duration of menopause from 0 to 32 years (average length of 13.73 ± 2.97 years) and duration of CLL 1 to 240 months (average length of 46.27 ± 20.76 months) and 4 men aged 46 to 75 years (middle age 61.75 ± 6.18 years) with disease duration from 2 to 18 months (middle duration of 7.50 ± 3.66 months.) with stage B and C disease.

Bivalos was intended for 3 months to 17 women aged 55 to 79 years (middle age 71.29 ± 1.56 years), duration of menopause from 0 to 39 years (average length of 19.50 ± 2.23 years) with disease duration from 0 to 180 months (average length of 47.82 ± 12.61 months) with stage B and C disease.

Statistical analysis and visualization of the data were performed using the statistical package OpenStat and Statgraphics (version 3.0).

**Results.** The patients with CLL levels of minerals in the BT of the LS in a group of women with age categories up to and over 60 years was significantly lower than in groups of men in their respective age categories. Osteopenic and OP changes in bone LS were observed in the group of men and women with CLL, and to over 60 years. Osteopenic syndrome is part of the clinical course of CLL — his lowest percentage (25 %) found in the category of men to 60 years of disease duration of 1 year, and the largest (100 %) — a group of women 60 and older than 60 years in groups with a duration disease over 5 years. In general patients with CLL groups OP level changes than the general population BT parameters and is over 50 %. Osteopenic and OP changes in BT LS were observed in the group of men and women with CLL, and to over 60 years.

Statistical modeling methods were statistical models of BMD changes depending on: a) sex and stage of disease (p < 0.01); b) sex, stage of disease and relative terms due to the BMD in young age (R2 = 0.93; p < 0.05); c) the stage of disease and chemotherapy protocols (R2 = 0.96; p < 0.05), corresponding to a high level of predictive. The calculation of the interest component of effective model proved reliable factors significant contribution of sex and stage of disease, and depending on the method chosen and the last chemotherapy treatment, prediction of BMD at the patients with CLL.

The prescription of Calcium-D3 Nycomed for 4 months at a dose of 1000 mg per day for women did not give any results in significant changes in BMD. Analyzing the state of BT LS at the men after treatment Calcium-D3 Nycomed marked increase in BMD was significantly in all areas studied, except vertebra L2. The ratio of the detected BMD due to its the same age, expressed as a percentage, was significantly increased in the vertebra L1 and L3 and the total areas L1-L2, L1-L3, L1-L4, L2-L3, L3-L4. In absolute terms was significant growth in all areas of study except L3-L4.

The prescription of the drug Ostalon for women with CLL has led to the increase of BMD statistically reliable data in L3, L1-L3, L1-L4 (at 5.4 %), L2-L3. Significant increase in the correlation between BMD diagnosed with due at a young age as a percentage observed in L3 and the total areas of the L1-L2, L1-L3, L1-L4, L2-L3. In absolute terms, it is statistically increased in areas of total L1-L3, L3-L4. The content of minerals has grown significantly in L2 and the total area of L1-L4 (8.5 %).

There was observed a significant increase in BMD LS at the women after therapy Bivalos and statistical reliability in all vertebrae. Significant increase in the correlation between BMD detected due to the young age as a percentage and in absolute terms the whole strength of LS. The same pattern was observed in relation to the value of BMD detected due to the same age. The content of minerals in BT was significantly increased after treatment Bivalos throughout the study area (total area at L1-L4 18.5 %), with the exception of vertebra L4. As for the geometric characteristics of LS — height, width and area of the vertebrae, changing these parameters were not statistically significant. The index, which reflects the ratio of the width of the content of minerals vertebrae was significantly increased by vertebrae L1, L2, L3 and summary sections L1-L2, L1-L3, L1-L4 (13.5 %).

In assessing of the impact on EORTC QLQ-C30 there was revealed a significant increase in the basic indicators of women who received treatment programs correction BT, comparing with groups of men.

**Conclusion.** Structural and functional state of BT at the patients with CLL is characterized by a decrease in the strength of the main characteristics of BT mineral content and BMD decrease. Reduced BMD in osteoporotic form changes require the development of adequate methods of medical treatment at different stages of the disease. Treatment with the drug program Calcium-D3 Nycomed, drug Ostalon and drug Bivalos can be implemented in practice treatment of osteopenic syndrome at the patients with CLL.

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**Duality of Genesis of Osteopenic Syndrome in Patients with Central Form of Ankylosing Spondylitis Complicated by Gastroesophageal Reflux**

**Introduction.** Ankylosing spondylitis (AS) is a frequent (0.2–2 % in the population) rheumatic disease with systemic extraarticular manifestations. The main clinical form of the AS is the central form. Patients with central form of AS suffered by disorders in the cervical and thoracic spine. These changes negatively affect the localization and the function of the neck and chest cavity, including the esophagus. It was found (on the basis of own previous studies) the clinical and endoscopic signs of gastroesophageal reflux (GER) were present in 3/4 patients with central form of the AS. Another frequent systemic manifestation of AS is osteopenic syndrome (OPS). OPS observed in 77–85 % of patients with AS. These disorders (GER and OPS) contribute to the progression of functional impairment and disability in patients with AS.

**Aim.** To investigate the mechanisms of formation of OPS in patients with central form of AS complicated by GER.
Materials and methods. 31 patients with AS complicated by GER were examined (main group). GER manifests a few years after the debut of the AS in all patients. Proton pump inhibitors (PPI) used to treat GER in the patients of main group. 20 patients with AS without GER have formed comparison group. Bone mineral density was studied by ultrasound densitometer Achilles Express. Statistical analysis was performed by parametric statistics. Reliability of differences was assessed by Student t-test. The relations between the qualitative attributes were investigated by calculating of the coefficient of association Yule — Q.

Results and discussion. OPS was detected in 25 (80.6 %) patients of the main group and in 14 (70.0 %) persons of the comparison group. Reliable differences in frequency of OPS between patients from main group and patients from comparison group have not been revealed. On the second stage of the study the main group of patients was divided into two subgroups (A and B) depending on the duration of PPI therapy. 20 patients received PPI less than 3 years (mean duration of using — 1.1 ± 0.6 years) were included in subgroup A. 11 patients received PPI more than 3 years (mean duration reception 4.1 ± 1.0 years) and they formed subgroup B. OPS was detected in 17 (85.0 %) patients from subgroups A and in 8 (72.7 %) patients from subgroup B. Index Z in patients of the subgroup A was —0.610 ± 0.088, index Z in patients of the subgroup B was —0.850 ± 0.113. Reliable differences in the index Z between the two groups of examined patients were absent (p > 0.05). However, the index T in the subgroup B (—2.700 ± 0.205) was significantly (t = 4.080, p < 0.001) lower than in the subgroup A (—1.720 ± 0.120). Analysis of relations between the prolonged use of PPI in patients with AS complicated by GER, on the one hand, and OPS, on the other hand, revealed medium strength association (Q = +0.360, p < 0.05).

Conclusion. Prolonged use of PPI in the treatment of GERD in patients with central form of AS enhances the expressivity of OPS. In my opinion, this situation is a result of occurrence of the calcium malabsorption phenomenon in hypoacid conditions. Thus, doctor should prescribe an additional antiosteoporotic drugs in the treatment of GER by PPI in patients with AS.

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Fractal Analysis of the Bone Tissue Status in Patients with Non-Hodgkin Lymphoma

Introduction. The change in mineral bone tissue (BT) density in patients with solid tumors, acute and chronic leukemias is a known fact. However, very few studies are devoted to monitoring the dynamics of mineral density changes of BT in patients with non-Hodgkin lymphoma (NHL). According to research rare mineral density BT changes are observed in 30—35 % of patients, and the average age of patients is over 60 years.

Aim of the research is to explore the dynamic changes of BT in patients undergoing NHL chemotherapy stage of treatment using the method of virtual bone biopsy.

Materials and methods. The analysis of changes of mineral density by direct measurement of BT density (in Haunsfield units) in trabecular parts of vertebrae of thoracic and lumbar spine on computer axial tomograms at stages of diagnosis and after chemotherapy (4—6 courses of chemotherapy CHOP protocol) treatment. In order to standardize and stabilize images of trabecular vertebral we used universal digital filter — «Mexican hat» wavelet. Densitometry of trabecular vertebral layer in thoracic and lumbar spine was performed in the applications of mathematical analysis of medical images DICOM — ClearCanvas Workstation and ImageJ with the BoneJ extension, freely distributed by the National Institute of Health (USA). Fractal dimension was observed by map-counting and box-counting algorithms.

Number of the patients was 30. 11 men and 19 women were among them. Average age was 64.51 ± 2.84 years. The diagnosis was established by the NHL world (NCCN, ESMO) and national criteria for the diagnosis of compulsory morphological and immunohistochemical verification. In all patients there was B-macrocell, CD20 positive lymphoma.

Results. Based on the analysis of axial slices BT scans and measurements of vertebral trabecular density of thoracic and lumbar spine in the above terms we found negative trend changes in patients’ BT. Changes in density of BT at diagnosis of disease stage were seen in a decrease in trabecular density of the vertebrae in 7 (63.6 %) men and 16 (84.2 %) women. Registered changes were mostly found in women and the depth decrease of vertebral BT density in women was significantly higher than in men. After completing chemotherapy in all patients there was further decline in the density of BT, but the rate of decrease was detected in different gender groups. Densitometric and fractal analysis (according to map-counting and box-counting algorithms) of the state of vertebral trabecular BT showed direct positive and reliable connection between the above parameters.

Conclusions. 1. The reduce of vertebral BT density of thoracic and lumbar spine of patients with NHL requires monitoring BT at all stages of the management of patients with NHL. 2. The reduce of density of trabecular vertebral in patients with NHL occurs at different rates for men and women at chemotherapy treatment stage. 3. There is a direct and reliable connection between densitometric characteristics and fractal dimensions (according to map-counting and box-counting algorithms) of state of trabecular vertebral in patients with NHL. 4. The perspective for further research is to identify the causes of changes in BT density in patients with NHL and the main factors that lead to it, as well as inclusion of the modifiers of BT into the maintenance and correction therapy.
Virtual Computer-Based Biopsy as a Non-Invasive Method for Diagnostics and Monitoring of Bone Tissue Status

Introduction. The evaluation of bone tissue (BT) status including its histomorphometric parameters requires invasive sampling which is traumatic, and therefore there is a need for non-invasive methods providing information on trabecular and cortical bone status.

Aim of study. To create a non-invasive technique for histomorphometric evaluation of thoracic and lumbar BT status of trabecular and cortical bone at the mesoscopic level for clinical use in oncology and osteology practice.

Materials and methods. The current method is based on estimating the dynamics of densitometric, linear and spatial characteristics on axial sections obtained by multislice computed tomography (CT) which is routinely used in oncology practice. The standardization and stabilization of the obtained trabecular bone image was achieved by using Mexican Hat wavelet filtering. Densitometry in trabecular and lumbar vertebrae was performed using medical imaging analysis software — Clear Canvas Workstation and ImageJ.

Results. We have developed a non-invasive technique for early detection and effective monitoring of vertebral BT status, which includes densitometric and histomorphometric assessment after chemo and radiation therapy in HL and NHL patients and allows creating valid approaches to timely differential implementation of structural and functional thoracic and lumbar vertebral BT modifiers in supportive therapy at all stages of specialized medical care.

Efficacy of Pamidronate Therapy Treatment in Patients with Osteogenesis Imperfecta

Introduction. Nowadays, orthopedic scientific achievement in the treatment of osteogenesis imperfecta (OI) is not limited to surgery, but also have in their arsenal modern medical therapy, which involves the use of drugs pamidronic acid (DPA) to correct structural and functional state of bone tissue (SFSBT). However, the treatment of these patients with drugs of pamidronic acid, will remain as unsolved issue regarding schemes, doses, combination with other antosteoporotic drugs, the number of cycles of administration depending on the type of OI and extent of damage of SFSBT.

The aim of the study. To improve the results of orthopedic treatment in patients with OI by applying antosteoporotic therapy that includes DPA.

Materials and methods. Orthopaedic treatment was conducted in 21 patients with OI, among them 13 — males and 8 — female. The mean age of patients was 9.4 ± 0.6. Distribution by type of OI (Silence D., 1982), I — 10, II — 11. Antosteoporotic therapy using the DPA, as an independent method was used in 10 patients and in the other 11 patients it was used along with the surgery. All patients received basic therapy of calcium supplements and active forms of vitamin D. DPA used in cycles, at a dose of 0.5—1.0 mg/kg for one cycle controlled by serum Ca level. Pharmacological preparation included 3—4 cycles separated by three month intervals. In type I of OI (level b-CrossLaps of 0.500 to 1.5 ng/ml, Z-score from −2.5 to −3.5) DPA was used in a dose of 0.5 mg/kg weight per cycle; in severe, with type III OI (b-CrossLaps from 1.5 to 3.5 ng/ml, Z-score of −3.5 and below) — in a dose of 1 mg/kg body weight per cycle. The effectiveness of treatment was assessed by the level of b-CrossLaps after 6 months and Z-score criterion of lumbar spine after a year of treatment.

Results. Clinically evaluated the results of 21 patients, paraclinically: Z-score — in 18 patients, b-CrossLaps in 21 patients. There was reduction of pain intensity in all patients after treatment. 18 patients (86 %) — no repeated pathological fractures; only 3 patients (14 %) during treatment had repeated pathological fractures — two fractured femur and one — tibia. Before treatment, 13 patients went independently, 8 lost this feature. Among the subgroup of operated 11 patients moved alone 4 (36 %), the other 7 (64 %) did not move. After a year of treatment alone 8 patients (72 %) moved alone; after 1.5 years — 9 (82 %) patients. In one patient among subgroup with nonoperative treatment who did not move after a year of the DPA therapy restored the function of walking. Observation period — 2—3 years after treatment.

In the overall group of patients there was noted increased Z-score by 1.13 (27 %), p = 0.022 and b-CrossLaps decreased by 0.46 (37 %), p = 0.021; in a subgroup of patients undergoing surgery — increased Z-score by 1.23, p = 0.05 and b-CrossLaps decreased by 0.26 ng/ml, p = 0.134; in the subgroup with non-operative treatment — increased Z-score to 1.01, p = 0.2 and b-CrossLaps decreased by 0.67, p = 0.05, indicating significant effectiveness of the proposed treatment.

Conclusion. The technique of complex treatment of orthopedic manifestations of OI, which includes drug therapy using the DPA as an independent method or in combination with surgical methods are appropriate and effective as evidenced by the positive dynamics of clinical and paraclinical parameters, regain patients gait function and support.