

**INSULIN RESISTANCE AS A RISK FACTOR OF OSTEODEFICIENCY
AT DIABETES MELLITUS COMPLICATED BY GOUT**
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At the present stage diabetes mellitus is a major health and social problem, taking a leading position in the world in prevalence of chronic non-infectious diseases (3-6% of the general population).

Disturbances of carbohydrate metabolism cause serious changes functioning of many body systems. The following musculoskeletal syndromes associated with diabetes: specific and general rheumatic syndromes (adhesive capsulitis, "shoulder-hand" syndrome, Dupuytren's contracture, osteoarthropathy, Charcot foot), diabetic hand syndrome, hyperostosis) and general rheumatic syndromes (osteoarthritis, gout and hyperuricemia, pyrophosphate arthropathy, osteopenia / osteoporosis, osteolysis of the tarsal bones, migrating osteolysis hip and knee).

Poorly controlled diabetes is an independent risk factor for osteopenia and osteoporosis in patients with type 2 diabetes, as well as gout, along with other rheumatic diseases, is a risk factor secondary osteoporosis.

Studies conducted by the Institute of Endocrinology and Metabolism behalf of V.P. Komissarenko of Academy of Medical Sciences, found that in patients with type 2 diabetes osteoporosis and osteopenia occur much more likely than in persons without diabetes mellitus. Swedish population study (1975-1998), which included 24,605 patients aged up to 31 years, found that the risk of hip fractures in women with diabetes in 9.8 times higher than in those without diabetes.

The basis of any osteodeficiency is a violation of calcium and vitamin D3 homeostasis. Recently, scientists have established the fact that an adequate calcium intake allows for a 33% lower risk of developing diabetes type 2. There is also data confirming the ability of calcium to reduce insulin resistance. Taking into account above described features we are aiming to study the mechanisms of osteodeficiency in the aspect of insulin resistance.

State of bone depends on the balance between the processes of bone resorption and formation. Using the definition of biochemical parameters of bone metabolism can evaluate activity of bone formation and resorption. Violation of bone remodeling processes contribute to the occurrence osteodeficit and steady progression of osteoporosis.

Aim – to assess the state of bone remodeling in the aspect of insulin resistance in patients with diabetes mellitus complicated by gout.

Materials and methods. A complex examination of 38 patients 40-68 years (44 men and 24 women) with diabetes mellitus complicated by gout was performed. For early diagnosis mechanism of osteodeficiency we used biochemical markers of bone homeostasis such as bone formation - the contents of the bone isoenzyme of alkaline phosphatase (BIAF) and bone resorption - tartrate resistant acid phosphatase (TRAF).

Results. To study the effect of insulin resistance on bone metabolism we divided patients into two groups: the first group - 20 patients with diabetes

mellitus type I and gout and the second group - 18 patients with diabetes mellitus type II in combination with gout.

We discovered imbalance in bone homeostasis caused by changes in bone resorption and bone formation: increased bone resorption and weakening of bone formation. There was significant difference in indicators of TRAF between I and II groups of patients with maximal values in I group. BIAF content was lowest in the I group of patients. The patients had different clinical forms of gout: asymptomatic hyperuricemia, intermittent and chronic gout. Tophi were found in 6 patients. Hyperuricemia ranged from 360 to 731 mmol/L. X-ray examination of affected joints reviled findings: moderate local osteoporosis, bone defects like vacuoles; small erosion on the articular surfaces; compaction and thickening of soft tissue, presence calcifications in the soft tissues; radiological signs of secondary osteoarthritis. We found an imbalance of bone remodeling: bone resorption gain till 17.2% and decrease of bone formation activity till 37.4% compared with a group of healthy individuals.

We investigated the influence of the diabetes length on bone metabolism: TRAF had a tendency to increase with age, while a BIAF conversely decreased. Similar trends were found at influence duration of existence of gout. To investigate the influence of uric acid on bone remodeling, patients were divided into subgroups according to the degree of hyperuricemia: the value of serum uric acid of 360-600 and higher 600 mmol/l.

We did not find significant difference in indicators of bone resorption in subgroups of patients with moderate and high level of hyperuricemia while BIAF content was lowest in the subgroup of patients with high values of serum uric acid (> 600 mmol/l).

Conclusions. Insulin resistance is a risk factor osteodeficiency in diabetic patients with gout. Markers of bone remodelling such as indicator of bone formation (BIAF) and bone resorption (TRAF) may be used for early diagnosis of osteodeficiency in patients with diabetes mellitus complicated by gout. The primary definition of these indicators need patients with a insulin-resistant diabetes (type II) and long history of diabetes mellitus and gout and patients with hyperuricemia exceeding the value of 600 mmol/L.