

**Shapkin V.E.**  
**CALCIUM METABOLISM CHANGES AS A FORMATION**  
**MECHANISM OF DIABETIC FOOT IN GERIATRIC PATIENTS**  
**Kharkiv National Medical University, Kharkiv, Ukraine**

The phenomenon of "aging population" takes place in industrialized countries now. The successes of modern medicine prolongs life, but don't improve its quality in all cases. General osteoporosis is one of the leading factors of health worsening of elderly patients. It looks like a "silent" epidemic in Ukraine. Diabetes mellitus (DM) is a common gerontological disease, leading to the development of secondary systemic osteoporosis. "Diabetic foot" syndrome is one of the osteoporosis manifestations at DM geriatric patients. But pathogenetic role of the calcium metabolism disturbance poorly described at the "Diabetic foot" formation.

The aim: to study the role of calcium metabolism at the formation of degenerative - dystrophic changes of the foot hard tissues in DM elderly patients.

Materials and methods. The study included 64 patients with DM Type II aged from 62 to 80 years. Disease duration was from 5 to 33 years. Patients agreed for the clinical trial. It is identified glycemia, glycosuria, ketonuria, hyperlipidemia, calcemia, alkaline phosphatase activity in serum; excretion of pyridinoline and deoxypyridinoline with the urine. The leading pathogenetic factors of diabetic feet osteoarthropathy are diabetic neuropathy, and (less) diabetic macro- and microangiopathy. Therefore sensomotor disorders, tendon reflexes (patellar, Achilles, plantar) were investigated. Circulation status of the lower extremities was studied by using skin thermometry, capillary refill test, pulse determining on a. dorsalis pedis, a. tibialis posterior, foot vessels dopplersonografy. The screening program also included feet X-ray.

Patients were divided into two groups. Group I included 24 patients with no signs of "Diabetic foot". Group II included 40 patients with I stage of "Diabetic foot" according to the Wagner classification (non-infected superficial ulcers of the foot).

The symptoms of diabetic neuropathy and angiopathy were detected at all patients. However, neuropathy (sensory, motor, autonomic), macro- and microangiopathy didn't lead to the defeat of feet muscles and hard tissues at patients of Group I. X-ray examination identified feet osteoarthropathy signs in all patients of Group II. Pathological process localized in bones and joints of the phalanges, metatarsus, tarsus, ankle joints.

Ankle joints, metatarsal-tarsal and metatarsal-phalangeal joints defeats prevailed. Resorptive processes (osteoporosis, osteolysis, erosions), periosteal bone formation, hyperostosis, calcification of soft tissues, subluxations determined. It should be noted that resorptive changes dominated at the metatarsus and phalanges,

but destructive processes dominated at tarsus and ankle joints. In general, the phalanx and metatarsal damage is typical for middle-aged patients.

Study of calcium metabolism showed the presence of the hypocalcemia (in Group I - 2.1 mmol / l in Group II - 1.9 mmol / l) and a reduction of the alkaline phosphatase activity (in Group I - 1.5 mmol / h l, in Group II - 1.2 mmol / h l) in both groups. Only a tendency to a decrease of these parameters took place in Group I. Ionized calcium fraction was significantly decreased only in Group II (0.8 mmol / l). Pyridinoline and deoxypyridinoline excretion level increasing was detected in both groups of patients. And in Group II these changes were significant.

Identified differences of calcium metabolism indicate signs of calcium malabsorption in DM patients and the processes of bone resorption intensification. This allows to conclude that calcium metabolism status (in particular, the severity of bone resorption) has significance at the development of diabetic hard tissue foot lesions as well as diabetic neuropathies and angiopathies. Insulin has a significant anabolic effect. It is known that a insulin production decreasing leads to the bone mineralization decreasing, reducing of the calcium blood serum level, increasing of the calcium urine secretion. The bone tissue trophics is broken – this is a result of the carbohydrate metabolism changes at cells and vascular lesions during insulin deficiency.

Calcium metabolism and bone resorption changes defined at the study point to the necessity of the calcium drugs including to the complex therapy of DM.