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ASSESSMENT OF THE TRABECULAR BONE INDEX IN PATIENTS WITH TYPE 1 DIABETES

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Introduction and Aim. Diabetic osteopathy in patients with type 1 diabetes (T1DM) is apparent. As a result, potential predisposition to an increased fracture risk could be suspected. However, approaches to its diagnosis are still ambiguous. The aim of this study was to observe the features of serum osteo-specific parameters, dual energy X–ray absorptiometry (DXA) data in T1DM patients. To study the quantitative and qualitative characteristics of the lumbar spine in T1DM patients. BMD was taken as a quantitative assessment and trabecular bone score (TBS) was used as qualitatively parameter.

Materials and methods. 157 patients with T1DM (105 women, 52 males) (mean age: 32.5 (25.5–41.6) yrs, duration of DM: 13 (7–20) yrs, age of manifestation: 19 (14–23) yrs, BMI: 23.43 (21.55–25,70) kg/m2; HbA1c: 8.2 (7.6–8.9) %) and 98 (67 women, 31 men) controls, comparable in sex, age and anthropometric data. The research involved general clinic examination, serum bone-specific parameters, DXA (bone mineral density (BMD) and trabecular bone score (TBS) of lumbar spine). Z–score of –2.0 or less was regarded as «low bone mineral density».

Results. There were no significant differences in L1-L4 BMD and TBS in women compared to men: 1.16 (1.08–1.26 vs. 1.16 (1.08–1.28) g/sm2) and 1.40 ((1.35–1.46) vs. 1.44 (1.37–1.49)g/sm2). Similar results were obtained in subgroups of T1DM patients and controls. There was a definite link between BMD (L1–L4) and TBS (L1–L4). Low BMD was detected in 14.6% (23) of the surveyed patients with T1DM and 4.1% (4) of controls. T1DM patients compared to controls had lower BMD and TBS: BMD 1.14 vs 1.23 g/cm2; TBS 1.39 vs 1.45, T-score TBS K 0.30 vs 0.10; Z-score TBS K 0.30 vs. 0.15. Detailed assessment in lumbar spine showed the largest decline in the first lumbar vertebra as T1DM patients as a control group, but more pronounced reduction was proved in T1DM patients – BMD L1 1.02 vs. 1.12 g/cm2; and TBS L1 1.29 vs. 1.34. In T1DM patients was established decreased alkaline phosphatase (77.98 vs 93.4 U/l) and osteocalcin (10.58 vs 19.73 ng/ml) compared with the control group. There were an increased osteoprotegerin levels (4.44 vs 2.74 pmol/l) and decreased RANKL/osteoprotegerin ratio (0.03 vs 0.05).

Conclusion. T1DM patients have decreased bone formation markers (alkaline phosphatase, osteocalcin) and elevated resorption markers (osteoprotegerin), which can lead to impaired mineralization (low BMD) and microstructure (low TBS). There were no differences between BMD and trabecular bone index by gender. T1DM patients have decreased BMD and TBS in the lumbar spine with a predominance of this trend in the first vertebra.