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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 anomalies 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  $46.4 \pm 3.2$ . The structural-functional state of bone tissue was determined by the method of ultrasonic densitometry. It was investigated the speed of distribution to the ultrasound (SDU, m/s), wide scale weakening of ultrasound (WWU, dB/MHz), the index of durability of bone fabric (ID BF, %), indexes of T and Z. In patients younger 50 BMD was estimated only Z-criterion. It was used a questionnaire with help of the minute test of estimation osteoporosis of risk (one-minute osteoporosis risk test), offered by International Association of Osteoporosis (IOA) in modification of Povoroznyuk V.V., Dzerovich N.I. (2006).

**Results.** According to the data of the minute test and anthropometric inspection, it was established that the high risk of osteoporosis took place in 56.4 % (35 persons), women prevailed — 24 (38.7 %,  $p < 0.05$ ). Among the anamnestic data which took place for mentioned

patients, there were complaints of fatigability and aching pains in a back after staying in a forced position or walking (43.5 %), the presence of low-energy fractures radix (17.8 %), spine (19.3 %), femur (3.2 %), the presence of femoral the relatives of the first-degree relation, number of own teeth to 20 and less (35.4 %).

The estimation of anthropometric data with determination of index of mass of body educed the presence of obesity of 1–2 degree for 21 (33.9 %) patients, reduction index of mass of body — in 37 %. Here in 12 (19.3 %) persons mass of body was less than, than 50 kg At an objective inspection in 18 (29 %) patients were observed strengthening of pectoral kiphosis, compensatory hyperlordosis, increase in the index Forestier, in 19 (30.5 %) — reduced grow.

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 %) is an osteoporosis, that folded 34.3 % from the group of high risk. By means of cross-correlation analysis it is set reliable negative relationship between the indexes of BRIDLES and age of women: for SDU made — 0.63 ( $p < 0.001$ ), WWU — 0.61 ( $p < 0.001$ ), IDBF — 0.67 ( $p < 0.001$ ). The correlation analysis also revealed a relationship between the index of WWU, which represents quality of bone tissue, 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.