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BONE MINERAL DENSITY IN PATIENTS WITH CIRRHOSIS OF THE LIVER

Abstract: The article presents data from a study of BMD in 75 patients with cirrhosis of the liver. The main group of the examined patients is represented by patients with cerebral palsy of alcoholic etiology — 45% and primary biliary cirrhosis of the liver — 36%. 72% of patients have BMD deficiency, and 25% have osteoporosis. The effect of the etiology of the disease on the incidence of osteopenia and the localization of osteoporosis was revealed. The analysis of the dependence of the frequency of osteopenia and/or osteoporosis on population risk factors, duration of the disease, and Child-Pugh class of liver failure was carried out.
Key words: cirrhosis of the liver; osteoporosis; osteopenia.

INTRODUCTION

Hepatic osteodystrophy combines two main bone structure disorders in patients with cirrhosis of the liver (CP): decreased bone mineral density (BMD) — osteopenia, osteoporosis — and osteomalacia. Osteoporosis and osteopenia are detected much more often than osteomalacia: according to the literature, in 20-100% of patients with CP. Osteomalacia develops, as a rule, only when joining to the CP of the syndrome of impaired absorption. The etiology and pathogenesis of hepatic osteodystrophy are multifaceted and include the involvement of many factors and mechanisms that They arise and act simultaneously, and some of them start a "vicious circle". However, despite the available known data on this issue, there are still many unresolved clinical problems. The development of osteopenia is undoubtedly influenced by population factors: age, menopause (physiological or surgical), hypogonadism (which can develop as a complication of liver cirrhosis), decreased BMI, alcohol intake, and eating disorders. But equally important are the risk factors that result from cirrhosis. liver: impaired metabolism of the hormone DZ, insufficiency of osteoprotegerin (OPG), insulin-like growth factor -1 (IGF-1). The formation of fibrosis in liver tissue leads to disruption of the mechanisms of synthesis of these substance. Iron deposition and increased cytokine production due to the chronic inflammatory process in the liver also lead to the development of bone structure disorders. It is impossible not to mention the genetic predisposition of patients with primary biliary cirrhosis to the development of BMD disorders due to the presence of certain alleles the gene encoding the vitamin DZ receptor. The presence of hyperbilirubinemia due to indirect fraction, hypoalbuminemia, and cholestasis in patients with chronic liver pathology also contributes to increased bone resorption. Conducting corticosteroid and diuretic therapy has a negative effect on bone metabolism. The purpose of this study was to establish the frequency of BMD disorders in patients with CP, to study the effect of the main clinical characteristics on the manifestation of these disorders, and to determine the main localization of BMD reduction in skeletal bones.

MATERIALS AND METHODS OF RESEARCH

75 patients suffering from cirrhosis of the liver of various etiologies and duration of the disease were examined. There are 54 women among them. (72 ± 6,1%), 39 (72 ± 7,2%) Of these, 21 were menopausal and male (28 ± 9.8%). The average age was 56.4 ± 12.3 years for women and 51.2 ± 7.9 years for men. The etiology of liver cirrhosis among the examined patients was distributed as follows: primary biliary cirrhosis was detected in 27 patients (36 ± 9.2%), alcoholic cirrhosis in 34 patients (45.3 ± 8.5%), other liver cirrhosis etiology (viral, mixed

(alcoholic and viral), Wilson-Konovalov disease, unspecified etiology) — in 14 patients (18.7 ± 10.4%). The duration of the disease in 28 patients (37.3 ± 9.1%) was more than 5 years, in 47 patients (62.7 ± 7.1%) — less than 5 years. In the analysis of hepatic cell insufficiency on the Child-Pugh scale, class A was established in 44 patients (58.7 ± 7.4%), class B - in 16 patients (21.3 ± 10.2%), class C — in 15 patients (20 ± 10.3%). During the examination of patients , such clinical characteristics as body mass index (BMI) and the presence of fractures were taken into account. To assess bone mineral density, all patients underwent dual-energy X-ray absorption measurement (DXA) (Lunar DPX21200) in the lumbar spine and femoral neck, which is the transmission of a photon stream of two energy levels of X-ray radiation through the bone to a detector with an analyzer that calculates the scan results. The BMD of the patients was assessed according to two criteria: criterion T — comparison of the revealed BMD of the patient with the norm corresponding to the peak of bone mass (at 30-35 years), and the Z criterion corresponding to the normal BMD value in this age subgroup. The results were expressed in standard square deviations (SD): a decrease in the T-test from -1.0 to -2.5 SD corresponded to osteopenia, a decrease in The T-criterion is less than -2.5 SD for osteoporosis.

THE RESULTS AND THEIR DISCUSSION

In the process of analyzing the obtained bone mineral density data, all the examined patients were divided into 3 groups. The first group included patients with osteoporosis in at least one of the studied departments, the second group — with osteopenia, respectively, and the third group — patients without impaired bone mineral density. During the examination, 35 patients (46.7% ± 8.4) were diagnosed with osteopenia, 19 patients (25.3% ± 10) — osteoporosis, no changes in bone mineral density were found in 21 patients (28% ± 9.8). Thus, in patients with cirrhosis of the liver , a decrease in BMD was found in 72% (62.2 – 81.8; CI 95%). Osteopenia and osteoporosis in women were found in 77.8% of the surveyed, which was significantly more common than among men (42.8%, p=0.01). Among women, the decrease in BMD was most often noted in the group of menopausal women — 82%, but the difference between the group of women with preserved menstrual function, in whom a decrease in BMD occurred in 66.7%, was not significant. The average age of women and men with osteopenia and osteoporosis is significantly it did not differ from the group of examined patients with preserved BMD. However, between age and criterion T there was a significant inverse correlation: r=-49; p<0.01 — lumbar spine — and r=-0.34, p<0.003 — femoral neck. There was no significant correlation between criterion Z, reflecting age-related decreases in BMD, and the age of patients. There was a significant relationship between the duration of the disease and the incidence of osteoporosis and osteopenia: among In patients with cirrhosis lasting less than 5 years, a decrease in BMD occurred in 61.7% of cases, and in 89.3% of patients with a duration of more than 5 years ($\chi 2$ = 5.3; p=0.021). There was no increase in the prevalence of osteoporosis and osteopenia in patients with cirrhosis of the liver depending on BMI. This may be due to the increased weight of patients due to the presence of edematous ascitic syndrome, which leads to incorrect calculation of BMI. In patients with cirrhosis of the liver, loss of bone density in the lumbar vertebrae was observed in 85.2% of cases with reduced BMD, isolated osteopenia of the lumbar spine was diagnosed in 18 (33.3%) patients with cirrhosis of the liver, the average T criterion was -1.4 ± 0.3; in combination with hip osteopenia — in 9 (16.7%), the average spine T criterion was -1.8 ± 0.4; The average T criterion of the femoral neck is (-1.7) ± 0.5. In 25.3% of patients with CP, BMD decreased to the level of osteoporosis. 5 (9.3%) of them had a combination of osteoporosis of the spine with osteoporosis of the hip, the average criterion of T vertebrae was -4.1 ± 0.2, the average criterion of T of the femoral neck was (-3.1) ± 0.3; 8 (14.8%) osteoporosis of the spine developed simultaneously with osteopenia of the femoral neck, the average criterion of T

vertebrae was (-3.0) ± 0.4, the average criterion of femoral neck T is (-1.6) ± 0.3; and 4 (7.4%) of patients suffered from osteoporosis of the spine without a decrease in BMD in the hip area, the average criterion of T vertebrae was (-3.1) ± 0.2. BMD loss in the femoral neck was significantly less common than in the spine, and a decrease in the T criterion in this area was noted in 59.3% (p=0.005). Isolated osteopenia of the femoral neck was observed in 8 (14.8%) patients (the average T criterion was -1.2 ± 0.1); osteoporosis of the femoral neck in combination with osteopenia of the spine — in 2 (3.7%), the average femoral neck T criterion was (-2.6) ± 0.2, and the average vertebral T criterion was (-1.6) ± 0.1. There were no isolated cases of femoral neck osteoporosis among the patients we examined. When analyzing the localization of osteoporosis and/or osteopenia in patients with various etiologies of the disease, the following feature was identified. In 24 of 26 patients with PBC with reduced BMD, spinal damage was noted, and only 2 patients had hip neck damage, the significance of the difference according to the Fisher criterion was $p<0.001$. In patients with alcoholic cirrhosis of the liver and in the group of patients with cirrhosis of the liver of other etiology, no significant difference in the localization of osteoporosis and osteopenia was found.

CONCLUSIONS

Our study showed that patients with CP are characterized by a higher prevalence than in the general population. According to epidemiological studies conducted in other regions of Uzbekistan, in the age group comparable to the group of patients we examined, osteopenia was 25 – 37.9% for women and 22.5 – 30% for men. The etiology of the disease and its duration have an impact on the incidence of osteopenia and osteoporosis and its localization. The results of densitometry performed in a group of patients with cirrhosis of the liver allow us to draw the following conclusion: • Patients with cirrhosis of the liver are characterized by a high prevalence of osteoporosis and osteopenia. Patients with primary biliary cirrhosis of the liver are at the greatest risk of developing this complication.; • the decrease in BMD in patients with cirrhosis of the liver is influenced not only by population risk factors, but also by the duration of the disease; • the etiology of the disease affects the localization of changes in bone tissue. In patients with PBTS mainly affects trabecular bone tissue, and in patients with alcoholic cirrhosis of the liver, trabecular and cortical bone tissue are equally affected.

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