SUMMARY

Chronic hepatitis is a continuous inflammatory hepatopathy capable of progression to cirrhosis, liver failure and death. This process can be initiated by viral infections, defective metabolism and unknown factors that initiate overreaction of immune responsiveness ***(Gupta and Fitzgerald, 1996)*.**

Bone turnover, the product of bone resorption and formation, is a tightly coupled process, with the net balance between the two will determine the bone mass and the serum calcium level ***(Mary et al., 2002).***

Hepatic osteodystrophy (HO) is a generic definition for the metabolic bone disease that may occur in individuals with chronic liver disease. Two distinct bone metabolic processes, osteoporosis (OP) and osteomalacia (OM) are combined together in various proportions in HO syndromes ***(Guichelaar et al., 2002).***

Osteoporosis is a disease characterized by low bone mass and architectural deterioration of bone tissue. Osteomalacia is characterized by defective mineralization of bone. Both of which are related to abnormalities of bone turnover ***(Rosen, 1996)*.**

Several studies suggest that reduced bone formation in patients with chronic liver disease is the primary abnormality (low turnover osteoporosis), whereas other report reduced or normal formation coupled with increased resorption (high turnover osteoporosis) ***(Idliman et al., 1997)*.**

Biochemical markers of bone turnover reflect the degree of increase in over all bone turnovers. The rate of bone formation and resorption can be combined to assess remodeling imbalance. The rate of bone remodeling can be assessed either by measuring an enzymatic activity of the

osteoblastic on osteoclastic cells, such as alkaline and acid phosphatase activity, or by measuring components of the bone matrix released into the circulation during formation or resorption, such as osteocalcin and pyridinoline cross links ***(Rosen, 1996)*.**

The only sure way to determine bone density and fracture risk for osteoporosis is to have a bone mass measurement (also called bone mineral density or BMD test) ***(Gilsanz, 1998).***

Bone mineral density testing is indicated for any one at risk of osteoporosis. Axial DXA is considered the gold standard for measuring bone mineral density. It has a precision of +/-3% and is used for diagnosis and to follow treatment ***(Martin, 1999).***

To detect changes of bone turnover we selected the measurement of serum level of B-ALP and osteocalcin (markers of bone formation) and the urinary level of DPd (marker of bone resorption) in the sera and urine samples of 100 children: 75 cases having chronic liver diseases and was divided into three groups; group I {metabolic liver disease group (GSD and Wilson disease)}, group II {AIH group (AIH type I and AIH type II)} and {chronic virus hepatitis group(HCV and HBV)} and 25 healthy children matched for the age and sex and served as a control group (group IV) .

Regarding the changes of bone turn over markers among our studied cases, it was found that irrespective of the etiology of chronic hepatic disease there was a significant increase of the serum level of the markers of bone formation (B-ALP and osteocalcin) in the three diseased groups in comparison with the control group.

AS a marker of bone resorption DPd level was increased in the three diseased groups with a high significant difference between them and the control group. But the level of DPd was significantly higher in group II

(AIH group) than in group I and group III (metabolic liver disease group and chronic virus hepatitis group) and this could be due to the added effect of steroids used for treating AIH.

The increased level of DPd together with the elevated serum levels of osteocalcin and B-ALP provide evidence for an uncoupling of increased bone resorption from bone formation, which implies high turn over osteoporosis in chronic liver diseases.

The level of DPd (marker of bone resorption) was higher in group of patients treated with corticosteroids than those did not receive any steroids.

Regarding the effect of the degree of liver insult on the level of bone turn over markers; it was found significant correlation between the increased levels of bone turn over markers and the deteriorating synthetic functions of the liver.

Bone turn over markers were significantly higher in cases had liver cirrhosis than in those had no cirrhotic changes as diagnosed by liver biopsy .Meanwhile the cases had no liver cirrhosis still had significantly higher levels of bone turn over than the control group.

To determine bone mineral density (BMD) dual-energy X-ray absorptiometry (DXA) was done for 3 children from each of the studied groups. Among the 9 cases having chronic hepatitis 6 of them were found to have decreased bone mineral density denoting the presence of osteoporotic changes in those children.

The level of bone turn over markers was significantly higher in group of patients who had osteoporotic changes as diagnosed by DXA than those did not.