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Vitamin D and bone density in chronic hepatitis C patients

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Abstract

Objective, As bone fragility is common in chronic hepatitis c the study asses to determine the level of vitamin D and bone density and to demonstrate the consequence of vitamin d insufficiency in patient of long standing hepatitis C. Material and Method, 45 individuals were taken as samples, patients with chronic HCV. DEXA was suggested to patients as a follow-up for their condition. An experienced radiology technician has been used as DEXA to evaluate the bone mineral density BMD on the anteroposterior lumbar spine views, bone markers also were evaluated in patient group and control group. Results The study found there was no significant difference between femoral neck and the spine in BMD between HCV patient and control group. The Trochanter and total femur BMD values of HCV mean show significantly low in the experimental group compare to healthy group. Bone mass measurements, Trochanter value (p-value =0.004) and all biochemical parameter are not significantly differed for patients compared to control. Conclusion, The study found no significant difference between viral hepatitis patients and control healthy subjects. Additionally, there was no significant differences in biochemical bone markers for other group.

Keywords
Hepatitis, Alkaline phosphatase, BMD, Hepatitis C Virus, Chronic HCV,

According to estimates from World Health Organization (WHO), 3.2% of people worldwide have hepatitis C virus serology results that are positive (HCV)zz[1]. Bone disorders are frequent side effects of the chronic hepatitis C (CHC), mostly because cirrhosis that is present[2]. Hepatitis C associated osteosclerosis (HCAO) rarely acquire disease marked an increase in bone soreness [3]. blood alkaline phosphatase increase, and widespread BMD marker for bone abnormalities have been identified and this leading to generally increase cortical thickening on the bone scan [3, 4, 5]. Such effect of chronic HBV is not always recognized. This is because osteoporosis and low BMD correlated with different risk factors such as aging, immobility[7], hypertension[8], hyperparathyroidism[9], use of antihypertensive agents, diabetes mellitus (DM), decrease calcium intake, deficiency of the vitamin D, and Various genetic factors[10].

When a skin exposed to sunshine, it produces cholecalciferol, generally known as Cholecalciferol (vitamin D3[11],). First converts of cholecalciferol into 25-hydroxyvitamin D (25-OHD) take place in

the liver by 25-hydroxylase [11, 12]. Abnormal metabolism of calcium and phosphorus develop from vitamin D insufficiency [13, 14]. Additionally, hypothesized develop the role of autoimmune disease, T2DM, cancer and progression of a number of viral diseases[13, 8]. According to clinical data, individual with liver disease such as CHC indicate vitamin D deficiency [16]. Low blood levels of 25-OHD can affect to reduce negative outcomes [16,17]. Alcoholic liver illnesses as well as interferon depend on therapy in CHC patients [18, 19].

Additionally, Vitamin D levels and histology in CHC are correlated with each other. Patients with vitamin D deficiency experience severe hepatic necrosis [20, 21]. Advanced level of fibrosis cause rapid development of fibrosis [23]. 25-hydroxylase enzymes CYP27A1 have been brought by a lack of vitamin D in liver tissue to be downregulated at the cellular level. Providing evidence for negative correlation between CYP27A1 expression and the degree of necro-inflammatory activity, leads to pathogenic importance [23, 24].

Materials and Methods

Subject

45 chronic HCV patients were taken as sample for the current research, age range (25−50 years) and 50 healthy people as control group. Attending Imam Hussein Medical City, Karbala, from March 2021 to July 2022. Patients with autoimmune liver disease, celiac disease, chronic kidney disease have been excluded from the study as well as patients or healthy individuals with a medical history having impact on the mass of bone calcium, bisphosphonates, estrogens, diabetes mellitus. This research also removed those patients using vitamin D supplements and those having a background of lumbar spine or hip fracture.

Collection Samples

Each participant in this research had 5 Milliliter of venous blood drawn. Centrifuge was used to separate the serum, then stored at -20 degrees Celsius. Utilizing conventional techniques, Creatinine and serum ALP levels were assessed by (a Japanese Hitachi 917 biochemical auto analyzer using an AUDIT kit)., calcium and phosphorus were measured using the spectrophotometric components of the AUDIT kit.. Using a vitamin D ELISA kit, vitamin D 25(OH) concentrations at the human plasma level were quantified by enzyme immunochromatography (Diametra, Milano, USA). An ELISA kit with a patented peak competitive assay (radioimmunoassay method).

BMD Measurements

Patients were offered DEXA as a follow-up for their condition. BMD was measured using DEXA scan (DEXXUM-3-OSTEOSYXS/ Korea) by a trained radiology technician on the anteroposterior lumbar spine (L1−L4 spine) views.

Statistical Analysis

Version 13 of SPSS has been used for the statistical analysis. (SPSS, Inc., USA, Chicago, IL). Analysis variance means and ST.DV of continuous variables were employed. Dichotomous variables that were reported as numbers and frequencies were examined using chi-square analysis. Considering value significant at $P \leq 0.05$.

Ethical Approve

All information and samples obtained were done within legal conditions and with the necessary approvals from all patients

Results

Table1: Males with chronic hepatitis C (CHC) and the healthy group's demographic information

parameters	CHC group N=45	Health group N=50	P-value
Age	41.60±11.99	43.2±12.18	0.72
Weight Kg	80.11±17.24	78.89±12.70	0.045
Height m^2			
BMI Kg| m^2	27.89±5.70	24.02±7.20	0.1255

Fundamental features are shown in Table 1 compares the group with CHC to the healthy group there was a significant increase in the mass index of CHC compared to the healthy group (p-value 0.045), as it was a statistically significant value. In this investigation, we

discovered no appreciable differences in spine and femoral neck BMD comparing HCV patients to wholesome controls as shown in Table2. BMD values for the femur and trochanter were a significant reduction in CHC mean than those of a healthy control group even after body weight correction (p-value 0.05).

Table 2: BMD in CHC patients and healthy controls

BMD (g/cm2)	CHC(N=45)	Controls (N = 50)	p-value
Spine (L1−L4)	1.154±0.13	1.151±0.11	0.92
Femoral neck	1.037±0.19	1.059±0.16	0.46
Trochanter	0.750±0.15	0.832±0.14	0.04
Total Hip	1.043±0.18	1.113±0.13	0.06

As been shown in Table 3, serum levels bone parameters are normal for all CHC and controls values. Data shows no differences in serum total calcium, phosphate results of HCV patients and control. The mean of serum creatinine did not differ significantly between HCV patients and controls.

Table 3, biochemical bone indicators of bone and mineral metabolism were examined in patient and control.

Parameters	CHC (N = 45)	Control (N = 50)	p*
Total calcium (mg/dl)	8.17±0.43	8.16±0.44	0.74
Phosphate(mg/dl)	3.23±0.37	3.06±0.35	0.34
Creatinine(mg/dl)	0.78±0.12	0.80±0.12	0.45
Alkaline phosphatase (UI/dl)	88.34±63.06	75.70±17.22	0.42
25 OHD (ng/ml)	35.40±10.07	26.61±6.18	0.15

Patients and controls calcification depended on 25-OHD status divided into three groups adequacy >30 ng/ml, insufficiency from 11 ng/ml to 29 ng/ml while deficiency 10 ng/ml. Regarding with 25-OHD status, there was no statistically significant difference for the classification groups as shown in Table 4.

Table 4: Classification of vitamin D levels in healthy controls and CHC males.

25-OHDng/ml	CHC N = 45	Control N = 50
Sufficiency >30	29 (64%)	13 (26%)
Insufficiency (11−29)	14 (31%)	36 (72%)
Deficiency (<10)	2 (5%)	1 (2%)

Discusion

According to the results of recent study, there was no significant change in each spine's and femoral neck's BMD between HCV and control group People infected with the hepatitis virus can be vulnerable. Infection with HCV may be an independent risk factor for loss of BMD[2]. In the case of those who have high degrees of cirrhosis or cirrhosis of the liver in addition to the C virus. Furthermore, significant highlight [26]. Patients with CHC have lower values for total hip BMD. This could be ascribed to the decrease of BMD results. Despite having healthy livers, CHC patients showed considerably lower trochanter BMD[26, 27]. Since recent study was one of the research to investigate BMD parameters in CHC patients who were not cirrhotic[5]. The current study proved that femur density is more affected by hepatitis C , we were able to prove that femur density is more affected by hepatitis C virus infection in an isolated and independent manner than other liver functions[29]. As it is been exhibited in Table 4, serum levels for each of CHC and controls give normal values to skeletal markers. Regards to the HCV patients and controls, there were no remarkable variations in the levels of total calcium, phosphate, alkaline phosphatase, and vitamin D. This was correlated with the literature [22]. Low bone density has been related to hepatic dysfunction with vitamin D deficiency in the intervening period. Numerous researches have been performed to establish a relationship of vitamin D supplementation to improve the way CHC patients by responding to therapy [23, 24]. clinical observations refer to decrease vitamin D serum levels leading to a negative response to pegIFN/RBV-based therapy CHC[30]. Vitamin D levels with HIV/HCV will be infection to tracked using the reference range for the sample setting. The present study is the first to evaluate BMD, bone health, and probability of morphometric

vertebral fracture in a significant proportion of mean with CHC. This involved in not studying the usual confounding factors for low bone density, as well as the fact that there were no appreciable irregularities in bone and mineral metabolism and a vitamin D level. This study was conducted to evaluate bone mineral density and bone metabolism The prevalence of morphometric vertebral fracture is significant, as the study was conducted on men who did not suffer from cirrhosis and had only CHC. Many studies can be conducted to be an expansion of the community sample and for different age groups to observe whether CHC could be a harbinger of osteoporosis or low bone density.

Conclusion

In this research, we found no significant variations for each CHC and control group. In addition to no finding any significant differences in the biochemical bone markers for either group.

Refrances

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