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Assessment of prevalence of vitamin D deficiency among chronic liver diseases patients and its correlation with severity of liver diseases: An observational study

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Abstract

Background: Vitamin D insufficiency and deficiency are prevalent in almost half the healthy population of developed countries. The role of vitamin D in the pathogenesis of Chronic liver diseases (CLDs) is not fully understood.Hence; the present study was conducted with the aim of assessing the prevalence of vitamin D deficiency among chronic liver diseases patients and its correlation with severity of liver diseases.Materials & methods: A total of 50 patients with presence of chronic liver diseases were included. Complete demographic and clinical details of all the patients were obtained. A Performa was made and spectrum of clinical profile of all the patients was recorded. Blood samples were obtained and serum vitamin D levels were obtained using auto-analyzer. Grading of the patients was done using Child-Pugh Score grading. All the results were recorded and analyzed by SPSS software.Results: Vitamin D deficiency was seen in 84 percent of the patients. Vitamin D levels among patients with Grade A, Grade B and Grade C of Child-Pugh score grade was found to be 32.36 ng/mL, 22.12 ng/mL and 16.48 ng/mL respectively. Significant results were obtained while correlating Vitamin D levels with Child-Pugh grade.Conclusion: Patients with chronic liver diseases have significantly altered Vitamin D metabolism. Hence; Vitamin D deficiency directly correlates with severity of disease.

Key words: Vitamin D, Chronic liver diseases

INTRODUCTION

Vitamin D insufficiency and deficiency are prevalent in almost half the healthy population of developed countries. Most experts define vitamin D insufficiency as a 25(OH)D level below 75 nmol/L (30 ng/mL) and deficiency as levels below 50 nmol/L (20 ng/mL). It is estimated that one billion people suffer from deficiency or insufficiency of vitamin D. In the United States, between 25% and 50% of the adult population has vitamin D deficiency. In patients with chronic liver diseases, the prevalence of vitamin D deficits is much higher and practically universal.[1- 3]

The role of vitamin D in the pathogenesis of Chronic liver diseases (CLDs) is not fully understood, but the involvement of vitamin D in the activation and regulation of both the

innate and adaptive immune systems, as well as its antiproliferative effect, appears to explain the importance of vitamin D in these liver diseases. According to numerous studies published earlier, it has been reported that 1 billion people worldwide have vitamin D deficiency or insufficiency. According to numerous studies published earlier, there is a widespread prevalence to differing degrees (50-90 percent) to vitamin D deficiency with poor dietary calcium intake in the Indian population.[4- 6]Hence; the present study was conducted with the aim of assessing the prevalence of vitamin D deficiency among chronic liver diseases patients and its correlation with severity of liver diseases.

MATERIALS & METHODS

The present study was conducted with the aim of assessing the prevalence of vitamin D deficiency among chronic liver diseases patients and its correlation with severity of liver diseases. A total of 50 patients with presence of chronic liver diseases were included. Complete demographic and clinical details of all the patients were obtained. A Performa was made and spectrum of clinical profile of all the patients was recorded. Blood samples were obtained and serum vitamin D levels were obtained using auto-analyzer. Grading of the patients was done using Child-Pugh Score grading. All the results were recorded and analyzed by SPSS software.

RESULTS

In the present study, a total of 50 patients with presence of chronic liver diseases were enrolled. Mean age of the patients was 51.23 years. There were 38 males and 12 females. Vitamin D deficiency was seen in 84 percent of the patients. Vitamin D levels among patients with Grade A, Grade B and Grade C of Child-Pugh score grade was found to be 32.36 ng/mL, 22.12 ng/mL and 16.48 ng/mL respectively. Significant results were obtained while correlating Vitamin D levels with Child-Pugh grade.

Graph 1: Prevalence of Vitamin D deficiency among patients with chronic liver diseases

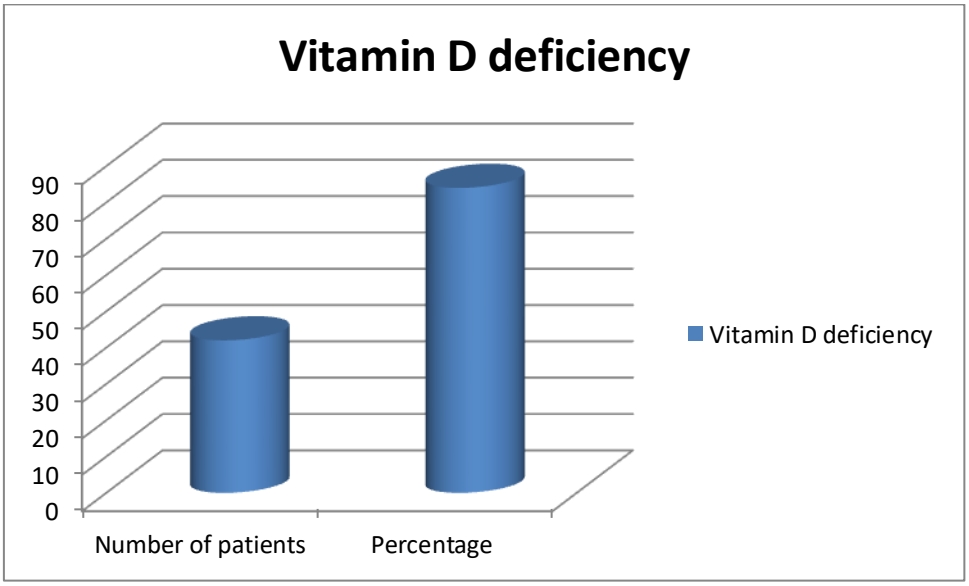

Table 1: Correlation of Vitamin D levels with Child-Pugh grade

Child-Pugh Grade	Mean Vitamin D levels (ng/mL)	SD	p- value
Grade A	32.36	4.8	0.00 (Significant)
Grade B	22.12	3.4	
Grade C	16.48	3.9	

DISCUSSION

Vitamin D (VD) is a lipid-soluble vitamin which, in addition to being an essential micronutrient, can also be considered a hormone involved in a complex system that regulates mineral homeostasis, protects skeletal integrity, and modulates cell growth and differentiation.There is growing interest in the non-classical or extra-skeletal functions of VD. Insufficient VD levels in CLD have been associated with an increase in bacterial infections, complications due to portal hypertension, severity of liver fibrosis and mortality. Given the increasingly important link between VD and liver disease, it seems appropriate to explore this relationship in patients with advanced CLD.[7- 10] Hence; the present study was conducted with the aim of assessing the prevalence of vitamin D deficiency among chronic liver diseases patients and its correlation with severity of liver diseases.

In the present study, a total of 50 patients with presence of chronic liver diseases were enrolled. Mean age of the patients was 51.23 years. There were 38 males and 12 females. Vitamin D deficiency was seen in 84 percent of the patients.Our results were in concordance with the results obtained by Arteh J et al who also reported similar findings. In their study, up to 93% of patients with chronic liver disease have insufficient vitamin D levels, and almost one-third of these showed severe deficiency.[9]Severe liver disease decreases vitamin D hydroxylation and albumin and DBP production, all of which are linked to low levels of 25(OH)D. Nevertheless, the vitamin D deficiency in chronic liver disease is only partly the result of a synthesis dysfunction of the liver, as evidenced by the fact that vitamin D deficiency is highly prevalent in non-cirrhotic patients.[10]

In the present study, vitamin D levels among patients with Grade A, Grade B and Grade C of Child-Pugh score grade was found to be 32.36 ng/mL, 22.12 ng/mL and 16.48 ng/mL respectively. Significant results were obtained while correlating Vitamin D levels with Child-Pugh grade.Our results were in concordance with the results obtained by ZubiaJamil et al who also reported similar findings. In their study, authors investigated vitamin D levels and their relationship with disease advancement in these patients. Vitamin D levels were checked in 125 chronic liver disease patients. The patients were classified in three stages according to Child-Pugh score: A, B and C. Among the patients, 88% had either insufficient or deficient stores of vitamin D, while only 12% had sufficient vitamin D levels ($p > 0.05$). Vitamin D levels were notably related to Child-Pugh class (contingency coefficient = 0.5, $p < 0.05$). On univariate and multinomial regression analyses, age, female sex, MELD and Child-Pugh class were predictors of low vitamin D levels. Age, model of end-stage liver disease score and Child-Pugh score were negatively correlated to vitamin D levels ($p < 0.05$). Vitamin D

deficiency is notably related to age, female sex and model of end-stage liver disease score, in addition to Child-Pugh class of liver cirrhosis.[11]

Vitamin D levels are inversely correlated with the severity of steatosis, necroinflammation and fibrosis independent of age gender, BMI, Homeostatic Model Assesment of IR score and presence of metabolic syndrome. In a recent clinical study of adults with NAFLD, Targher et al showed that the vitamin D levels had an effect on the development of hepatic steatosis and in the severity of the histological lesion. In fact, their hypothesis stated that patients with greater inflammation and fibrosis had lower vitamin D levels independent of other components of the metabolic syndrome.[11- 13]

CONCLUSION

Patients with chronic liver diseases have significantly altered Vitamin D metabolism. Hence; Vitamin D deficiency directly correlates with severity of disease.

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