DOI: https://doi.org/10.53350/pjmhs22169993

ORIGINAL ARTICLE

Frequency of Vitamin D Deficiency and its Association with CP Class in Cases of Liver Cirrhosis

ZOHA NASIR[1], MUHAMMAD USAID KHAN[2], HINA BATOOL[3], NAVEED NAYYER[4], JALIL IQBAL[5], MUHAMMAD ZUBAIR[6]
[1]*Woman Medical Officer Bahawal Victoria Hospital, Bahawalpur*
[2]*Senior Medical Officer Government Shahbaz Shareef Hospital DHQ, Multan*
[3]*Medical Officer Salman Naeem Health Care Hospital Multan*
[4]*Assistant Professor of Medicine Bahawal Victoria Hospital, Bahawalpur*
[5]*Associate Professor Department of Medicine Shahida Islam Medical College Lodhran*
[6]*Assistant Professor of Medicine Bakhtawar Amin Medical and Dental College Multan*
Correspondence to: Zoha Nasir, Email: zohanasir22@gmail.com, Cell: 03116731216

ABSTRACT

Objective: To find out the frequency of vitamin D deficiency and its association with CP class in cases of liver cirrhosis.
Study Design: Cross sectional study.
Place and Duration: Bahawal Victoria Hospital, Bahawalpur (From September 2021 to March 2022).
Methodology: Total 195 cirrhotic patients of any etiology, 20-40 years of age both male and female were selected. Vitamin D deficiency and its association with CP class was assessed.
Results: Mean age of cirrhotic patients was 38.46 ± 11.383 years. Out of 195 patients, vitamin D was deficient in 83 (43%) patients. Vitamin D deficiency was found in CP class A, B and C 7 (7.78%) patients, 13 (44.83%) patients and 63 (82.89%) patients respectively. CP class had significant (P = 0.000) association with vitamin D deficiency.
Conclusion: In this study, higher proportion of cirrhotic patients had deficient levels of vitamin D. Most of the patients were between 20-40 years. A higher number of male patients had deficient levels of vitamin D. It is also concluded that vitamin D deficiency is significantly associated with CP class.
Keywords: liver cirrhosis, CP class, vitamin D, hepatic osteodystrophy.

INTRODUCTION

In affluent countries, about half of the healthy population had inadequacy or deficiency of vitamin D.[1] Vitamin D levels below 20 ng/mL and 30 ng/mL was defined by majority of the professionals as deficiency and insufficiency respectively.[2] One billion people are thought to experience vitamin D deficiency or inadequacy.[3]

In Pakistan, Bangladesh, India, Nepal and Sri Lanka, vitamin D deficiency was prevalent in 73%, 67%, 67%, 57% and 48% patients respectively.[3] First time abnormal levels of vitamin D in cirrhotic patients was noted in 1970.[4-5] The musculoskeletal system is impacted by a complex interaction between serum calcium, phosphate, vitamin D and parathyroid hormone levels caused by liver cirrhosis. Hepatic osteodystrophy is the name given to these skeletal liver disease symptoms.[6] Cirrhotic individuals who have hepatic osteodystrophy have a higher chance of fractures, which has a negative impact on their morbidity.[7]

A popular grading technique for predicting cirrhotic patients' 1-year survival rate is the Child-Pugh (CP) score which was initially proposed by Child and Turcotte. Later on Pugh et al., modified the CP score which uses five parameters to categories patients in the early stage, intermediate stage and advanced stage of liver cirrhosis, including ascites, prothrombin time (PT), hepatic encephalopathy, serum albumin and bilirubin. Ascites, hepatic encephalopathy, portal hypertension, esophageal varices, and hepatocellular cancer are all well-researched and well-known effects of liver cirrhosis.[8]

We planned this study to find out the magnitude of vitamin D deficiency and its association with CP class of liver cirrhosis. Results of this study may help us for early management of vitamin D deficiency in patients of liver cirrhosis. We may be able to reduce morbidity related to vitamin D deficiency.

MATERIAL AND METHODS

This was a cross sectional study which was conducted at Department of Medicine, Bahawal Victoria Hospital Bahawalpur. Duration of study was 6 months (September 2021 to March 2022). Total 195 patients of liver cirrhosis were selected. Inclusion criteria was: cirrhotic patients of any etiology, 20-40 years of age, both male and female were selected. Exclusion criteria was: patients taking Vitamin D supplements, steroids, calcium and antiepileptic drugs.

An approval was taken from ethical review committee of the hospital before start of study. Written informed consent was taken from every patient.

Detailed history and demographic data was taken. 5 ml blood was taken and send to laboratory for serum levels of 25-hydroxyvitamin D and results were noted on pre-designed proforma in term of Vitamin D deficiency (Yes/No).

Data was analyzed by using SPSS version 17. Age was presented in form of mean and SD. Vitamin D deficiency was presents as Yes/No, gender as Male/Female and CP class was presented as CP Class A, CP Class B, CP Class C. Stratification in relation to age, gender and CP class was done. Chi-square test was applied to detected association of Vitamin D deficiency with age, gender and CP class. P value ≤0.05 was taken as significant.

RESULTS

In this study mean age of cirrhotic patients was 38.46 ± 11.383 years. Out of 195 patients, 83 (43%) patients had vitamin D deficiency. (Fig. 1) 20-40 years and 41-60 years age groups were created. There were 102 (52.3%) patients in age group 20-40 years and 93 (47.7%) patients were in age group 41-60 years. (Fig. 2) Male patients were 150 (77%) while female patients were 45 (23%). (Fig. 3) CP class A patients were 90 (46%) followed by CP class B 29 (15%) and CP class C patients were 76 (39%). (Fig. 4) In age group 20-40 years, vitamin D was deficient in 44 (43.14%) patients while in age group 41-60 years, it was deficient in 39 (41.94%) patients. Deficiency of vitamin D was insignificantly (P=0.865) associated with age group. (Table 1)

Fig 1: Frequency of vitamin D deficiency

Vitamin D deficiency was found in 50 (33.33%) male patients and in 33 (73.33%) female patients. Association of gender with vitamin D deficiency was significant (P=0.000). (Table 2)

Vitamin D deficiency was found in CP class A, B and C 7 (7.78%) patients, 13 (44.83%) patients and 63 (82.89%) patients respectively. CP class had significant (P = 0.000) association with vitamin D deficiency. (Table 3)

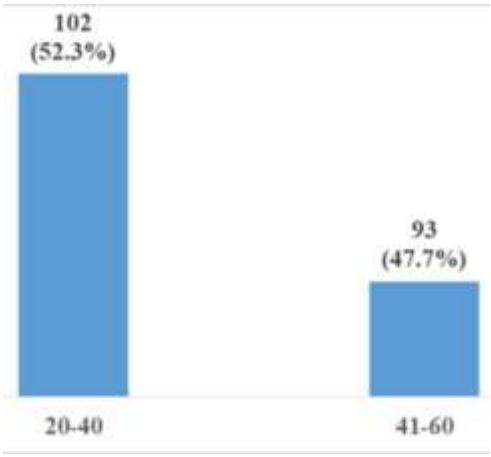

Fig. 2: Age distribution

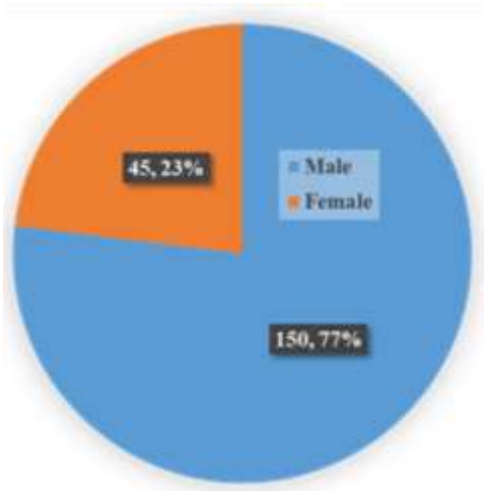

Fig. 3: Gender distribution

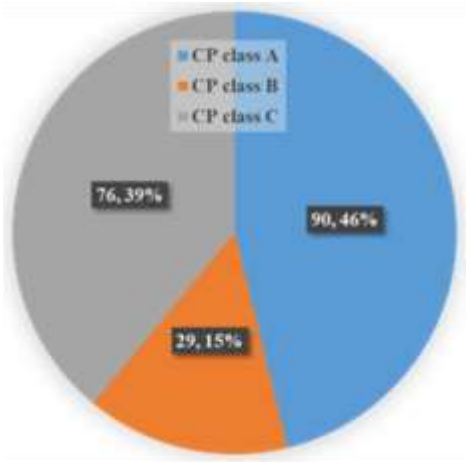

Fig. 4: Child-Pugh class distribution

Table 1: Stratification in relation to age

Age group	Vitamin D deficiency		Total	P. value
	Yes (%)	No (%)		
20-40 Years	44 (43.14)	58 (56.86)	102 (52.31)	0.865
41-60 Years	39 (41.94)	54 (58.06)	93 (47.69)	
Total	83 (43)	112 (157)	195	

Table 2: Stratification in relation to gender

Gender	Vitamin D deficiency		Total	P. value
	Yes (%)	No (%)		
Male	50 (33.33)	100 (66.67)	150 (77%)	0.000
Female	33 (73.33)	12 (26.67)	45 (23%)	
Total	83 (43)	112 (157)	195	

Table 3: Association of vitamin D deficiency with child pugh class

CP class	Vitamin D deficiency		Total	P. value
	Yes (%)	No (%)		
CP class A	7 (7.78)	83 (92.22)	90 (46.15)	0.000
CP class B	13 (44.83)	16 (55.17)	29 (14.87)	
CP class C	63 (82.89)	13 (17.11)	76 (38.97)	
Total	83 (43)	112 (157)	195	

DISCUSSION

In current study, we find out the frequency of vitamin D deficiency and its association with CP class in cases of liver cirrhosis. Mean age of cirrhotics was 38.46 ± 11.383 years. Out of 195 patients, vitamin D was deficient in 83 (43%) patients. CP class A patients were 90 (46%) followed by CP class B 29 (15%) and CP class C patients were 76 (39%). Vitamin D deficiency was found in CP class A, B and C 7 (7.78%) patients, 13 (44.83%) patients and 63 (82.89%) patients respectively. CP class had significant (P = 0.000) association with vitamin D deficiency.

Jamil et al[10] studied vitamin D deficiency in 125 patients of liver cirrhosis and mean age of patients was 56.88 years. Authors found that 34.4% patients had vitamin D deficiency which is comparable with our study. They also found significant association of vitamin deficiency with CP class. Paternostro et al[11] studied 199 cirrhotic patients for vitamin D deficiency and they found that 40% patients had deficiency of vitamin D. In study of Kumar et al[12] out of 160 cirrhotic patients, total 51.85% patients had vitamin D deficiency. Fernandez et al [13] reported that out of 94 cirrhotic patients, 87% patients had deficient vitamin levels.

Putz-Bankuti[14] studied 75 cirrhotic patients for vitamin D deficiency. Authors reported that 71% patients had low level of vitamin D. Finkelmeier et al[15] reported that 68.9% cirrhotic patients of our study had deficient levels vitamin D. CP class A, B and C patients were 20.3%, 47.0% and 32.7% respectively. Stokes et al[16] studied vitamin D in 65 cirrhotic patients. They reported that 86% patients had low levels of vitamin D. Results of these studies are not concur with our study. In our study Males and females were 150 (77%) and 45 (23%). In study of Finkelmeier et al[15] females were 31.9% and males were 68.1%. In study of Stokes et al[16] females were 34% and males were 66%. Gupta et al[17] selected 100 patients of CLD, they found vitamin D deficiency in 43% patients. In this study total 91% were males and 9% were females.

CONCLUSION

In this study, higher proportion of cirrhotic patients had deficient levels of vitamin D. Most of the patients were between 20-40 years. A higher number of male patients had deficient levels of vitamin D. It is also concluded that vitamin D deficiency significantly associated with CP class.

Recommendation: "We find in this study that as the disease advances, the levels of vitamin D become more deficient. So, vitamin D levels should be routinely checked in all patients liver cirrhosis, so that adequate replacement by vitamin D supplements can be initiated as a therapeutic adjunct in managing such patients."

Ethics approval and consent to participate: "Already mentioned in material and methods"

Conflict of Interest: None
Funding: None

REFERENCES

1. Iruzubieta P, Terán Á, Crespo J, Fábrega E. Vitamin D deficiency in chronic liver disease. World journal of hepatology. 2014 Dec 12;6(12):901.
2. Sowah D, Fan X, Dennett L, Hagtvedt R, Straube S. Vitamin D levels and deficiency with different occupations: a systematic review. BMC public health. 2017 Dec;17(1):1-25.
3. Siddiqee MH, Bhattacharjee B, Siddiqi UR, MeshbahurRahman M. High prevalence of vitamin D deficiency among the South Asian adults: a systematic review and meta-analysis. BMC public health. 2021 Dec;21(1):1-8.
4. Hepner GW, Roginsky M, Moo HF. Abnormal vitamin D metabolism in patients with cirrhosis. The American journal of digestive diseases. 1976 Jul;21(7):527-32.
5. Long RG, Wills MR, Skinner RK, Sherlock S. Serum-25-hydroxy-vitamin-D in untreated parenchymal and cholestatic liver disease. The Lancet. 1976 Sep 25;308(7987):650-2.
6. Malham M, Jørgensen SP, Ott P, Agnholt J, Vilstrup H, Borre M. Vitamin D deficiency in cirrhosis relates to liver dysfunction rather than aetiology. World J Gastroenterol 2011;17:922-925
7. Gatta A, Verardo A, Di Pascoli M, Giannini S, Bolognesi M. Hepatic osteodystrophy. Clin Cases Miner Bone Metab 2014;11:185-191
8. Kumar, A., Kumar, A., Riaz, S.U., Kumar, R., Ghauri, M.I. and Setlani, N.K., 2018. Child-Pugh Score Predicts Mortality Better than Model of End Stage Liver Disease: A Study in a Tertiary Care Hospital in the Periphery of Karachi. ANNALS OF ABBASI SHAHEED HOSPITAL AND KARACHI MEDICAL & DENTAL COLLEGE, 23(3), pp.130-135.
9. Konstantakis C, Tselekouni P, Kalafateli M, Triantos C. Vitamin D deficiency in patients with liver cirrhosis. Annals of Gastroenterology: Quarterly Publication of the Hellenic Society of Gastroenterology. 2016 Jul;29(3):297.
10. Jamil Z, Arif S, Khan A, Durrani AA, Yaqoob N. Vitamin D deficiency and its relationship with Child-Pugh class in patients with chronic liver disease. Journal of clinical and translational hepatology. 2018 Jun 6;6(2):135.
11. Paternostro R, Wagner D, Reiberger T, Mandorfer M, Schwarzer R, Ferlitsch M, Trauner M, Peck-Radosavljevic M, Ferlitsch A. Low 25-OH-vitamin D levels reflect hepatic dysfunction and are associated with mortality in patients with liver cirrhosis. Wiener Klinische Wochenschrift. 2017 Jan 1;129(1-2):8-15.
12. Kumar R, Kumar P, Saxena KN, Mishra M, Mishra VK, Kumari A, Dwivedi M, Misra SP. Vitamin D status in patients with cirrhosis of the liver and their relatives—A case control study from North India. Indian Journal of Gastroenterology. 2017 Jan 1;36(1):50-5.
13. Fernández Fernández N, Linares Torres P, João Matias D, Jorquera Plaza F, Olcoz Goñi JL. Vitamin D deficiency in chronic liver disease, clinical-epidemiological analysis and report after vitamin d supplementation. Gastroenterol Hepatol 2016;39:305-310
14. Putz-Bankuti C, Pilz S, Stojakovic T, Scharnagl H, Pieber TR, Trauner M, Obermayer-Pietsch B, Stauber RE. Association of 25-hydroxyvitamin D levels with liver dysfunction and mortality in chronic liver disease. Liver International. 2012 May;32(5):845-51.
15. Finkelmeier F, Kronenberger B, Zeuzem S, Piiper A, Waidmann O. Low 25-hydroxyvitamin D levels are associated with infections and mortality in patients with cirrhosis. PLoS One. 2015 Jun 29;10(6):e0132119.
16. Stokes CS, Krawczyk M, Reichel C, Lammert F, Grünhage F. Vitamin D deficiency is associated with mortality in patients with advanced liver cirrhosis. European journal of clinical investigation. 2014 Feb;44(2):176-83.
17. Gupta BK, Saini ML, Nehara HR, Meena SL, Saini M, Gupta J. Evaluation of vitamin D deficiency in patients with chronic liver disease and its clinical significance. International Journal of Nutrition. 2016;2(2):29-35.