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The Effect of Vitamin D and Parathyroid on Hepatitis C Patients and Non-Hepatitis C Patients on Chronic Hemodialysis Patients

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Abstract

Background: The importance of vitamin D and the safety of the parathyroid gland in people who are on long-term dialysis, as well as its effect on people who have hepatitis C at the same time and how they are related.

Method: This clinical laboratory study included chronic dialysis patients with hepatitis C infection at Habib Bin Mazahir Al-Asadi Center in Iraq, Karbala Governorate, and patients without chronic hepatitis at Dr. Adel Al-Sabbah chronic dialysis center in Iraq, Karbala Governorate, between April 2022 and August 2022. It included 200 patients. It included 100 hepatitis C patients and 100 non-hepatitis C and B patients.

Result: The results showed that there were no statistical differences between hemodialysis patients infected with hepatitis C and those without hepatitis C (Age, B. Urea, S. Creatinine, ALP, VIT D, and PTH) (0.58, 0.61, 0.97, 0.79, 0.28 and 0.95) respectively. Spearman's correlation of dialysis patients with hepatitis C and uninfected hepatitis C (ALP and PTH negative), (ALP and PTH positive) p-value (0.00 and 0.00 respectively) and correlation coefficient (0.405 and 0.363) respectively. We found that severe insufficiency of vitamin D was more common in patients with hepatitis C than those without infection of hepatitis C.

Conclusion: In conclusion, vitamin D and parathyroid hormone levels are crucial factors that impact bone health and mineral metabolism in patients with Chronic Kidney Disease (CKD) undergoing hemodialysis, regardless of Hepatitis C (HCV) status. Research indicates that both HCV infection and CKD on hemodialysis can lead to imbalances in vitamin D and parathyroid hormone levels, which can increase the risk of complications such as bone fractures, cardiovascular disease and mortality.

Keywords: Vitamin D; Hemodialysis; Hepatitis C; Parathyroid hormone

Introduction

Chronic Kidney Disease (CKD) is a progressive decline in kidney function. When the kidneys cannot filter waste and excess fluid from the body, a clinical illness known as kidney failure develops; it is estimated that 8%-16% of the global population suffers from CKD [1,2]. Treatments for End-Stage Renal Disease (ESRD) commonly include such things as hemodialysis, peritoneal dialysis, kidney transplantation, and replacement treatments [3,4]. The spread of chronic hepatitis C is a serious issue for society. There were predicted to be 58 million new chronic HCV infections and 1.5 million new HCV infections worldwide in 2019, according to the World Health Organization (WHO) [5]. Chronic hepatitis C is related to a 50%rise in proteinuria and a 43% increase in CKD incidence. Cryoglobulinemic vasculitis causes membranoproliferative glomerulonephritis. HCV-positive individuals had shorter kidney transplant survival. Chronic HCV infection and CKD raise the risk of ESRD and dialysis mortality. Hemodialysis patients have a higher HCV prevalence. A strong correlation and poor prognosis indicate the need for HCV therapy in CKD patients [5-7]. Vitamin D functions by activating vitamin D receptors, which alter the interpretation of several genes. Vitamin D's main job is to change how the body absorbs it [8,9]. Hemodialysis patient mortality and quality of life are increased by Vitamin D and Parathyroid Hormone (PTH) metabolic imbalances [10,11]. Vitamin D supplementation helps control chronic hepatitis C [12]. Studies have shown that not enough vitamin D and abnormal levels of Parathyroid Hormone (PTH) are linked to liver fibrosis and different kinds of hepatic dysfunction in people with chronic hepatitis C [13,14]. This treatment approach may contribute to the lack of association between PTH and vitamin D status. Additionally, elevated levels of PTH have been linked to cardiovascular disease, in addition to their negative impact on bone health [9-15].

Materials and Methods

Study population and design

This clinical laboratory study included chronic dialysis patients with hepatitis C infection at Habib bin Mazahir Al-Asadi Center in Iraq, Karbala Governorate, and patients without chronic hepatitis at Dr. Adel Al-Sabbah chronic dialysis center in Iraq, Karbala Governorate, between April 2022 and August 2022. It included 200 patients. It included 100 hepatitis C patients and 100 non-hepatitis C and B patients.

Excluded criteria

The exclusion criteria were as follows: HBsAg-positive patients, pregnant and lactating women, people with liver cancer and cancer in general, and children under 17 were all barred from participating.

According to the protocol of the national program of the Iraqi Ministry of Health

Patients with CKD who had been HCV positive by testing using Real-Time Polymerase Chain Reaction (RT-PCR and ELIZA) for at least three months before being included in the trial were eligible for participation. They varied in age from 18 to 65 years old.

The devices used

- MINI VIDAS
- COBAS C 111
- ELIZA

Statistical methods

SPSS, Inc.'s Statistical SPSS package for windows version 25 was used for the statistical analysis. Descriptive data include minimum, maximum, mean, and standard deviation for regularly distributed quantitative data. Descriptive quantitative data for qualitative data was a number and percentage. When data wasn't normal, the median was utilized. All statistical tests were significant at P 0.05. Two independent t-tests and a spearman's correlation exact test were used to determine significance.

Results

Regarding gender, the number of hemodialysis patients infected with the hepatitis C virus was men (52) and females (48). As for the number of hemodialysis patients who participated and were not infected with hepatitis C, there were men (58) and females (42) (**Table 1**).

Table 1: Gender and lab characteristics of study participants (N=200).

Patients	Gender	Frequency
Patients hepatitis C virus-positive	Male	58
	Female	42
	Total	100
Patients hepatitis C virus-negative	Male	52
	Female	48
	Total	100

As for the gender distribution with measured the proportion of vitamin D, the number of hemodialysis patients without hepatitis C is 100 patients, of whom patients with severe deficiency <10 ng/dl is 31%, while patients with 10-20 ng/dl deficiency was 45% and patients with <20-30 ng/dl was 23%. Still, normal patients with >30 ng/dl was only 1%. As for the gender distribution with measured the proportion of vitamin D, the number of hemodialysis patients with hepatitis C positive is 100 patients, of whom patients with severe deficiency <10 ng/dl is 56%, while patients with 10-20 ng/dl deficiency was 29% and patients with <20-30 ng/dl was 11%. Still, normal patients with >30 ng/dl was only 4% percent (**Table 2**).

Table 2: Distribution levels and different clinical and biochemical values parameters among 200 hemodialysis patients.

	Mean ± SD with (HCV)	Mean ± SD without (HCV)	P-value
Age	41.47 ± 10.90	37.60 ± 10.57	0.58
B. Urea	128.55 ± 39.26	110.14 ± 47.48	0.61
S. Creatinine	9.9 ± 3.5	9.5 ± 3.2	0.97

ALP	495.69 ± 419.52	141.84 ± 101.41	0.79
VIT D	12.9 ± 7.4	14.9 ± 6.4	0.28
PTH	423.3 ± 344.8	305.7 ± 226.5	0.95

We found severe vitamin D deficiency in hemodialysis patients with hepatitis C and the highest percentage of patients not infected with hepatitis C. The number of hepatitis C patients as 56%, and the number of hepatitis C non-infected patients was 31% (**Table 3**).

Table 3: Distribution of gender and VIT D of values among 200 hemodialysis patients.

		VIT D patients hepatitis C virus-negative				**Total**
		Severe insufficiency <10 ng/dl	**Insufficiency 20-10 ng/dl**	**Deficiency 30-20 ng/dl**	**Normal >30 ng/dl**	
Gender	Male	18	21	12	1	52
	Female	13	24	11	0	48
Total		31	45	23	1	100
		VIT D patients hepatitis C virus-positive				**Total**
		Severe insufficiency <10 ng/dl	**Insufficiency 20-10 ng/dl**	**Deficiency 30-20 ng/dl**	**Normal >30 ng/dl**	
Gender	Male	29	19	6	4	58
	Female	27	10	5	0	42
Total		56	29	11	4	100

Correlation is significant at the 0.01 level (2-tailed). The spearman's correlation was used to assess the relationship between clinical and biochemical parameters of 25 (OH) D levels in hemodialysis patients with hepatitis C. No significant change was found in serum levels. Age (p=0.44), B. Urea (p=0.55), S. Creatinine (p=0.88), ALP (p=0.89) and PTH (p= 0.17) **(Table 4).

Table 4: Spearman's correlation of VIT D patient's hepatitis c virus-positive levels and different clinical and biochemical parameters.

Parameter	**Correlation coefficient**	**P-value**
Age	-0.071	0.48
B. Urea	-0.088	0.38
S. Creatinine	0.071	0.48
ALP	0.025	0.8
PTH	-0.14	0.16
Note: PTH: Parathyroid Hormone; ALP: Alkaline Phosphatase.		

Correlation is significant at the 0.01 level (2-tailed). The spearman's correlation was used to assess the relationship between clinical and biochemical parameters of 25(OH) D levels in hemodialysis patients without hepatitis C. No significant in hemodialysis patients without hepatitis C. No significant change was found in serum levels. Age (p=0.44), B. Urea (p=0.55), S. Creatinine (p=0.88), ALP (p=0.89), and PTH (p=0.17) **(Table 5).

Table 5: Spearman's correlation of VIT D patient's hepatitis c virus- negative levels and different clinical and biochemical parameters.

Parameter	Correlation coefficient	P-value
Age	-0.077	0.44
B. Urea	-0.06	0.55
S. Creatinine	-0.015	0.88
ALP	0.013	0.89
PTH	-0.136	0.17
Note: PTH: Parathyroid Hormone; ALP: Alkaline Phosphatase.		

Correlation is significant at the 0.01 level (2-tailed). Spearman's correlation was used to assess the relationship between clinical and biochemical variables in hemodialysis patients with hepatitis C positive. A statistical relationship was found in serum levels. ALP* PTH (0.0001). In hemodialysis patients not infected with hepatitis C, an association was found, ALP*PTH (0.0001) **(Table 6).

Table 6: Spearman's correlation with dialysis patients with hepatitis C and non-infected hepatitis C.

Parameter	Correlation coefficient	P-value
PTH × ALP Negative	0.405	0.000**
PTH × ALP Positive	0.363	0.000**
Note: PTH: Parathyroid Hormone, ALP: Alkaline Phosphatase.		

Discussion

In a study conducted in Iraq, Karbala Governorate, hemodialysis patients, many of which were 200 patients, were divided into two parts. The first section was hemodialysis patients infected with hepatitis C, and the second was hemodialysis patients not infected with hepatitis C. Several chemical and biological parameters were tested, such as vitamin D, Parathyroid Hormone, Alkaline Phosphatase, B. urea, and S. Creatinine. There were no statistical differences between all patients except for one difference between ALP and PTH. The risk of vitamin D insufficiency is much higher for welfare consumers having maintenance hemodialysis than for patients who are not receiving assistance [16]. Hemodialysis patients have increased mortality, and patients on hemodialysis who had low plasma 25-hydroxyvitamin D (25(OH)D) levels were at a higher risk of death [17]. The seasonal fluctuation of vitamin D was substantially related to a seasonal variation in patients who did not use vitamin D supplements and those with low vitamin D concentrations [18]. However, the percentage of vitamin D in the Iraqi people is low in the sick and the non-patients. The reason is due to the weather in Iraq in the winter, which is very cold, which forces most Iraqis to wear clothes that cover most parts of the body. In the summer, they stay away from the sun because of the temperatures they reach. On some days, it can be higher than 50°C.

Conclusion

Chronic kidney disease patients with viral hepatitis may have difficulty obtaining enough vitamin D through traditional sources, such as sunlight and dietary intake. In this case, the best source of vitamin D for these patients may be vitamin D supplements prescribed by their healthcare provider. Additionally, chronic kidney disease patients with viral hepatitis should work with their healthcare team to manage their condition, as the combination of these two conditions can increase the risk of liver damage and other complications. It is important to note that vitamin D supplements should be taken under the guidance of a healthcare professional, as excessive vitamin D intake can lead to vitamin D toxicity, which can cause serious health problems.

References

1. Mahmoud AM, Lin W, Patial V, Ganesh RN, Viswanathan P (2023) Model organisms in renal pharmacology: 2022. Front Pharmacol 14: 1139806.
2. Centers for Disease Control and Prevention (2009) Hepatitis C virus transmission at an outpatient hemodialysis unit--New York, 2001-2008. MMWR Morb Mortal Wkly Rep 58: 189-194.
3. Queeley GL, Campbell ES (2018) Comparing treatment modalities for end-stage renal disease: A meta-analysis. Am Health Drug Benefits 11: 118-127.
4. Swai J, Zhao X, Noube JR, Ming G (2020) Systematic review and meta-analysis of clinical outcomes comparison between different initial dialysis modalities in end-stage renal disease patients due to lupus nephritis prior to renal transplantation. BMC Nephrol 21: 156.
5. Michael TG, Anwar CA, Ahmed OA, Sarhan I, Elshazly Y, et al. (2022) Micro-elimination of hepatitis C in patients with chronic kidney disease: An Egyptian single-center study Egypt. J Intern Med 34: 2-10.
6. Smolders EJ, de Kanter CTMM, Hoek BV, Arends JE, Drenth JPH, et al. (2016) Pharmacokinetics, efficacy, and safety of hepatitis C virus drugs in patients with liver and/or renal impairment. Drug Saf 39: 589-611.
7. Cacoub P, Desbois AC, Isnard-Bagnis C, Rocatello D, Ferri C (2016) Hepatitis C virus infection and chronic kidney disease: Time for reappraisal. J Hepatol 65: S82-S94.
8. Bikle DD (2014) Vitamin D metabolism, mechanism of action, and clinical applications. Chem Biol 21: 319-329.
9. Nazzal ZA, Hamdan Z, Natour N, Barbar M, Rimawi R, et al. (2021) Prevalence of vitamin d deficiency among hemodialysis patients in palestine: A cross-sectional study. Int J Nephrol 2021: 6684276.
10. Barta V, DeVita M, Rosenstock JL (2021) chronic kidney disease–mineral and bone disorder (ckd-mbd) osteoporos. A Clin Caseb pp: 109-121.
11. Brandenburg V, Ketteler (2022) Vitamin D and secondary hyperparathyroidism in chronic kidney disease: A critical appraisal of the past, present, and the future. Nutrients 14: 3009.
12. Behera MK, Shukla SK, Dixit VK, Nath P, Abhilash VB (2018) Effect of vitamin D supplementation on sustained virological response in genotype 1/4 chronic hepatitis C treatment-naïve patients from India. Indian J Med Res 148: 200-206.
13. Backstedt D, Pedersen M, Choi M, Seetharam A (2017) 25-Vitamin D levels in chronic hepatitis C infection: association with cirrhosis and sustained virologic response. Ann Gastroenterol 30: 344-348.
14. Gabr SA, Alghadir AH (2021) Handgrip strength and Vitamin D as predictors of liver fibrosis and malnutrition in chronic Hepatitis C patients. Dis Markers 2021: 6665893.
15. Ishtawi S, Jomaa D, Nizar A, Abdalla M, Hamdan Z, (2023) Vitamin D level, pain severity and quality of life among hemodialysis patients: A cross-sectional study. Sci Rep 13: 1182.
16. Yoshida K, Yonaha T, Yamanouchi M, Sumi H, Taki Y, et al. (2021) Welfare receipt and the risk of vitamin D deficiency in Japanese patients on maintenance hemodialysis: A cross-sectional, retrospective study. Ren Replace Ther 7: 45.
17. Heng-Jung Hsu, I-Wen Wu, Kuang-Hung Hsu, Chiao-Yin Sun, Chun-Yu Chen, et al. (2020) Vitamin D deficiency, cardiothoracic ratio, and long-term mortality in hemodialysis patients. Sci Rep 10: 7533.
18. Maraj M, Hetwer P, Dumnicka P, Ceranowicz P, Mazur-Laskowska M, et al. (2020) Acute phase proteins and vitamin d seasonal variation in end-stage renal disease patients. J Clin Med 9: 807.