



Research Article

VITAMIN D LEVELS AND COMORBIDITIES IN CRITICALLY ILL PATIENTS

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ARTICLE INFO

Article History:

Received 10th February, 2018

Received in revised form 6th

March, 2018 Accepted 24th April, 2018

Published online 28th May, 2018

Key words:

Vitamin D, comorbidities, Critically Ill,
Diabetes, Hypertension

ABSTRACT

Not many studies on serum vitamin D concentration and common comorbidities in critically ill Indian population are available. This study was aimed to evaluate the vitamin D status and associated comorbidities which may contribute in worsening the health status in critically ill population.

Methods: This was an observational study which included thirty ICU patients. Demographic profile and clinical parameters were noted. 2ml blood was collected for the laboratory estimation of vitamin D concentration. Patients were grouped into Deficient (Vitamin D level <30ng/ml) and Sufficient (Vitamin D level >30 ng/ml).

Results: Majority (86.6%) of the critically patients had a vitamin D concentration <30 ng/ml. The common comorbidities associated with critical illness were hypertension, diabetes mellitus, cardiovascular diseases and chronic obstructive pulmonary diseases. An inverse relation was found between vitamin D level and comorbidities.

Conclusion: The proportion of vitamin D deficiency among critically ill Indian population was found to be very high (86.6%). Patients with vitamin D levels of < 20 ng/ml had higher comorbidities compared to patients with Vitamin D level > 20 ng/ml. In view of the increased burden of vitamin D deficiency, it is important to recognize and treat vitamin D deficiency as early as possible. Early treatment can prevent the occurrence of undesired comorbidities which may adversely affect the health status in critically ill.

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INTRODUCTION

Vitamin D has been found to be useful in many conditions. Studies have highlighted many beneficial roles of vitamin D in prevention and treatment of conditions like cardiovascular diseases, diabetes, hypertension and osteoporosis. Ram S Kaulgud *et al* had reviewed thousands of articles on role of vitamin D in various spectra of diseases.¹ Vitamin D deficiency may be associated with poor patient outcome like increased susceptibility to infection, increased morbidity, mortality and prolonged ICU stay^{2,3,4,5}. Vitamin D is a fat soluble vitamin and functions like hormone. Data has revealed the role of vitamin D in immune responses to Pathogens and in inflammatory pathways and the deficiency may lead to infection, organ failures and associated morbidity and mortality.^{6,7,8,9} The institute of Medicine (in 2011) has recommended a minimum vitamin D level of 20ng/ml for skeletal health in US population¹⁰. The Endocrine Society (in 2011), has recommended vitamin D level of at least 30ng/ml for overall health benefits¹¹.

The aim of the study was to determine the vitamin D status in critically ill patients and to evaluate the common co comorbidities which may adversely affect the outcome in critically ill patients.

METHODS

Institutional, ethical and research clearances were obtained before conducting the study. A written Informed consent was taken. Thirty patients who needed admission to intensive care unit (medical and surgical) of tertiary care centres from India, Government Medical college Kozhikode and ACME Pariyaram were included in this study. The study was conducted from October 2015 to March 2016. Patients aged above 18 years were included in this study. Blood samples collected (2 ml) in plain test tubes after vein puncture were transported to the ISO certified laboratory for estimation of vitamin D concentration. Vitamin D estimation was done by Chemi Luminescent Immunoassay

RESULTS

The subjects were aged from 23 to 69 years with mean age of 50.87± 13.9 years. Vitamin D levels less than 30 ng/ml were seen in 86.6% critically ill patients.

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Table 1 Common Comorbidities Associated With Critical Illness

Comorbidities	Yes	No	Total
Diabetes Mellitus	4(13.3%)	26(86.7%)	30(100%)
Hypertension	8(26.6%)	22(73.3%)	30(100%)
Cardiovascular diseases	3(10%)	27(90%)	30(100%)
Chronic Obstructive Pulmonary diseases	3(10%)	27(90%)	30(100%)
Alcoholism	4(13.3%)	26(86.7%)	30(100%)
Smoking	9(30%)	21(70%)	30(100%)

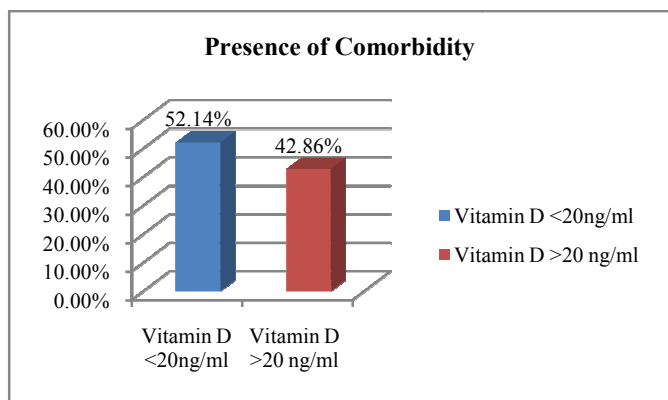


Figure 1 Association of Vitamin D Level and Comorbidity

Out of 21 patients, 12 (57.4%) patients with vitamin D levels <20 ng/ml had higher comorbidities, compared to 9 (42.86%) patients with vitamin D level >20 ng/ml. An inverse relation was noticed between vitamin D level and Comorbidity.

DISCUSSION

Deficiency of vitamin D was found to be high among general population around the world. In India 50 - 90% of the population was found to be vitamin D deficient among all the age groups^{3,4}

The present study showed that a high proportion (86.6%) of critically ill patients were vitamin D deficient with a vitamin D level <30ng/ml. Vitamin D deficiency and associated comorbidities can adversely affect the patients with critical illness.

Vitamin D receptors have been found in beta cells of pancreas and the deficiency may lead to the development of diabetes. Vitamin deficiency is also associated with hypertension, cardiovascular diseases, and respiratory tract infection.

Among 30 critically ill patients, 21(70%) patients had associated comorbidities and 9 (30%) patients did not have any associated comorbidities. Out of the 21 patients, 12(57.14%) patients with low vitamin D level (< 20ng/ml) had higher comorbidity compared to 9(42.86%) patients with high vitamin D (>20ng/ml) levels. The instances of comorbidities were found to be lesser in patients with higher Vitamin D levels. We found an inverse relationship between vitamin D level and presence of comorbidity.

According to the Institute of Medicine, a vitamin D level of at least 20 ng/ml is required for skeletal health¹⁰. A higher vitamin D level of at least 30ng/ml was recommended by the Endocrine Society for optimal health benefits¹¹. The proportion of patients with a vitamin D level less than 30 ng/ml was found to be very high in our critically ill population. So, early recognition and vitamin D therapy might improve the health status in critically ill.

Limitations of This Study

Only thirty patients were included in this present study, and the analysis was mainly exploratory in nature. We need larger studies to know the exact role of vitamin D in critical illness and the effect of vitamin D therapy in reducing the adverse effects and associated Comorbidities.

CONCLUSION

This study highlights the existence of vitamin D deficiency in a large number in critically ill Indian population. It was found that patients with vitamin D levels <20 ng/ml had more Comorbidities compared to patients with high vitamin D level (Vitamin D Level > 20ng/ml). We noticed an inverse relation between vitamin D level and Comorbidities. So, it is important to recognize and treat vitamin D deficiency to improve the health status in the critically ill.

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