International Journal of Current Advanced Research
ISSN: O: 2319-6475, ISSN: P: 2319-6505, Impact Factor: 6.614
Available Online at www.journalijcar.org
Volume 8; Issue 10 (C); October 2019; Page No.20261-20263
DOI: http://dx.doi.org/10.24327/ijcar.2019.20263.3952

Research Article

SERUM 25-HYDROXYVITAMIN D STATUS IN CRITICALLY ILL ADULT POPULATION IN NORTH KERALA, INDIA

Kolathu Parambil Radhika[1]*, Balakrishnan Valliyot[2] and Mubarak K.K[3]

[1]Department of Anaesthesiology, Government Medical College, Kozhikode, Kerala, India
[2]Department of Medicine, Center for Medical Research and Non Communicable Diseases (CMRNCD), ACME, Pariyaram, Kannur, Kerala, India
[3]Department of Anaesthesiology, Government Medical College, Kozhikode, Kerala, India

A R T I C L E I N F O

Article History:
Received 10th July, 2019
Received in revised form 2nd August, 2019
Accepted 26th September, 2019
Published online 28th October, 2019

Key words:
25-hydroxyvitamin D level, critically ill, vitamin D sufficiency

A B S T R A C T

Limited studies are available on the serum 25-hydroxyvitamin D status in critically ill population of North Kerala. We aimed to study the serum 25-hydroxyvitamin D level in critically ill adult patients admitted to intensive care units.

Methods: In this observational study, 250 critically ill adult patients were included. Age and gender distribution were noted. Blood samples were collected for the estimation of serum 25-hydroxyvitamin D, the main circulating form of vitamin D. According to the serum 25-hydroxyvitamin D level, patients were categorized into different groups having a serum level of less than 10 ng/ml, 10 to 19.9 ng/ml, 20 to 29.9 ng/ml, and more than 30 ng/ml. Patients with more than 30 ng/ml serum 25-hydroxyvitamin D were considered as vitamin D sufficient.

Data analysis: Data collected through structured and validated proforma were entered into spreadsheet software and analysed.

Results: In the study population, 8.4% had less than 10 ng/ml, 39.2% had 10 to 19.9 ng/ml, 33.6% had 20 to 29.9% and 18.8% had more than 30 ng/ml serum 25-hydroxyvitamin D level

Conclusion: Sufficient level of serum 25-hydroxyvitamin D level (ie, more than 30 ng/ml) was observed in 18.8% of critically ill population.

INTRODUCTION

Vitamin D is a micronutrient which is synthesized in the skin on exposure to sunlight. The FAO/WHO Expert Consultation stated that most of the geographical areas between 42º North and 42º South latitude get sunlight in abundance.[1] North Kerala receives abundant sunlight throughout the year.

Adequate serum 25-hydroxyvitamin D levels are important for the proper immunological as well as metabolic functions. Apart from helping in bone mineralisation, it has antimicrobial actions through vitamin D dependent steps in immune process.[2] Low serum 25-hydroxyvitamin D levels are usually found in patients with infection and sepsis which increase the morbidity and in-hospital death in critically ill patients.[3,4,5.]

Vitamin D sufficiency is defined as serum level of 25-hydroxyvitamin D level more than 30 ng/ml.[6] Sufficient level of serum vitamin D has a role in reducing various infections. The usual causes of morbidity and mortality in critically ill patients are infection and systemic inflammation leading to sepsis.[7,8,9] Vitamin D acts as a hormone and bind to specific Vitamin D Receptors (VDR).[10,11]

Corresponding author:* **Kolathu Parambil Radhika
Department of Anaesthesiology, Government Medical College, Kozhikode, Kerala, India

VDRs are present in most of the immune cells and vitamin D has a role in reducing the risk of developing various infections by the antimicrobial action and thereby reduce sepsis occurrence in vulnerable patients.[12,13]

In this observational study, we explored the serum 25-hydroxyvitamin D status in critically ill population from North Kerala.

METHODS

Institutional Ethical Clearance was taken before conducting the study. A written informed consent was obtained. In this study, 250 patients who were admitted to intensive care units of tertiary care centre in North Kerala, India were included. Patients above 18 years were included. Pregnant patients, lactating women, patients with malabsorption syndrome, chronic liver disease, chronic kidney disease, patients on drugs which interfere with Vitamin D metabolism and patients on vitamin D supplementations were excluded from the study. Blood samples collected from critically ill patients were sent to ISO certified laboratory for serum 25-hydroxyvitamin D estimation by Chemi Luminescent Immunoassay. According to serum 25-hydroxyvitamin D level, critically ill patients were divided into different groups.

Data Analysis

Data collected through structured and validated proforma were entered into spreadsheet software. Patients were categorized into different groups according to serum 25-hydroxyvitamin D level.

RESULTS

Serum 25-hydroxyvitamin D status in critically ill patients:
Among 250 critically ill adult patients, 21 (8.4%) patients had less than 10 ng/ml serum vitamin D level, 98 (39.2%) patients had 10 to 19.9 ng/ml serum vitamin D level, 84 (33.6%) patients had 20 to 29.9 ng/ml serum vitamin D level and 47 (18.8%) patients had more than 30 ng/ml serum vitamin D level.
A majority of patients (81.2%) had less than 30 ng/ml serum 25-hydroxyvitamin D level. Only 18.8% patients had vitamin D sufficiency.

Table 1 Distribution of serum 25-hydroxyvitamin D level in critically ill patients.

Serum 25-hyrdoxyvitamin D level	Number of Critically Ill Patients
< 10 ng/ml	21 (8.4%)
10-19.9 ng/ml	98 (39.2%)
20-29.9 ng/ml	84 (33.6%)
>30 ng/ml	47 (18.8%)
Total	250 (100%)

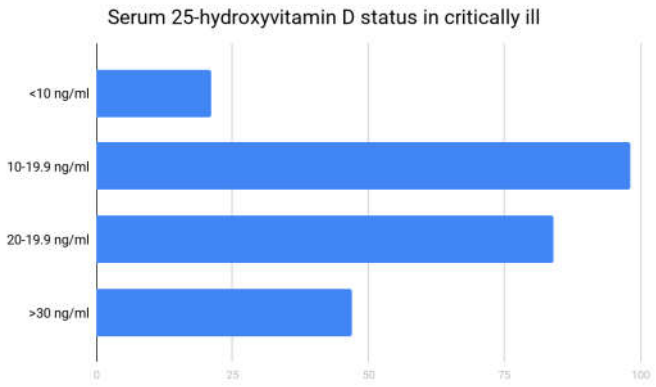

Figure 1 Serum 25-hydroxyvitamin D status in critically ill

DISCUSSION

Vitamin D deficiency was found to be high in the general population around the world and in India 50-90% were found to be vitamin D deficient among all age groups[3,4]. The present study showed that a total of 18.8% of critically ill patients had vitamin D sufficiency of more than 30 ng/ml serum 25-hydroxyvitamin D level.

Critical illnesses are usually adversely affected by low serum 25-hydroxyvitamin D level. It is observed that a sufficient level of serum vitamin D level will decrease the morbidity and mortality in critically ill population. In the present study we observed that only 18.8% critically ill population had sufficient level of serum vitamin D level and the remaining 81.2% had less than 30 ng/ml serum vitamin D level. The same distribution of serum 25-hydroxyvitamin D level was observed in a study by Vipul Prakash *et al* in critically ill patients from northern part of India, 81.2% had less than 30 ng/ml serum vitamin D level and 18.8 % had more than 30 ng/ml serum vitamin D level.[14] Both the studies were done in tertiary care centres.

Amrein K *et al* did an observational study in critically ill population from a tertiary care centre in Graz, Austria and found that 86.3% patients had less than 30 ng/ml serum vitamin D level and 13.6% patients had more than 30 ng/ml serum vitamin D level.[15] The distribution of serum 25-hydroxyvitamin D level in critically ill patients was similar to that observed in our study. According to United States Endocrine Society, the optimum serum 25-hydroxyvitamin D level for optimum health is considered as 30 ng/ml.[16] So there is a need to improve the serum vitamin D level in the critically ill population to improve the overall health.

CONCLUSION

Sufficient level of serum 25-hydroxyvitamin D was observed only in 18.8% of critically ill adult patients. Majority of the critically ill population had less than 30 ng/ml serum 25-hydroxyvitamin D level. This study highlights the need to improve the serum 25-hydroxyvitamin D level in the critically ill adult population.

References

1. Report of Joint FAO/WHO Expert Consultation on vitamin and mineral requirements in human nutrition; Bangkok 1998. Second Edition FAO Rome, 2004 Available at http;/whqlibdoc.who.int/publications/2004/9241546123.pdf.
2. Nijnik A, Hacock REW. The roles of cathelicidine LL-37 in immune defences and novel clinical application. Curr Opin Hematol. 2009 Jan; 16(1): 41-7.
3. Goswami R Misra SK, Kochupillai N: Prevalence and potential significance of vitamin D deficiency in Asian Indians. *Indian J Med Res* 2008,127 (3):229-238
4. Harinarayanan CV, Joshi SR: Vitamin D status in India – its implication and remedial measures. *J Assoc Physicians India* 2009, 57:40-48.
5. Michael F Holick and Tai C Chen. Vitamin D deficiency: a worldwide problem with health consequences. *Am J Clin Nutr* 2008; 87(suppl): 1080S6S.
6. GR Gupta A, Vitamin D deficiency in India: Prevalence, Causalities and Interventions. Nutrients. 2014 Feb 21; 6(2); 729-75.
7. Bone RC, Balk R A, Cerra FB *et al* "Definitions for sepsis and organ failure and guidelines for the use of innovative therapies in sepsis. The ACCP/SCCM Consensus Conference Committee. American college of Chest Physicians /Society of Critical Care Medicine" Chest 101(6):1644-55.1922 .
8. Derek C Angus and Tom van der Poll "Severe Sepsis and Septic shock". N Engl J Med 369 (9):840-851.2013
9. Dellinger, RP; Levy MM, Carlet JM *et al* "Surviving Sepsis Campaign: international guidelines for management of severe sepsis and septic shock 2008". Intensive Care Medicine 34 (1):17-60.2008
10. PK Sasidharan, E Rajeev, V Vijayakumari, "Tuberculosis and Vitamin D Deficiency in Kerala, India" *Journal of association of Physicians of India* (JAPI) 50:2002
11. Ram S. Kaulgud, Shreyas AC, Vinay SP *et al*. "Emerging roles of Vitamin D in Various spectra of diseases." *International Journal of biomedical Research*.04 (05):2013. www.ssjournals.com
12. Hariri Ahari M, Pishbin E. Vitamin D and sepsis. Rev Clin Med. 2014; 1(4):225-228
13. Jordan A Kempker, Vin Tangpricha, Thomas R Ziegler. Vitamin D in sepsis: from basic science to clinical impact. Critical care 16:316.2012

14. Vipul P, Shuchi C, Avinash A *et al*. Correlation of Serum vitamin D Level with mortality in patients with Sepsis. Indian J Crit Care Med. 2017; Apr; 21 (4): 119 - 204.
15. Amrein K , Zajik P, SchnedlC, Waltensdorfer A *et al* Vitamin D status and its association with season, hospital and sepsis mortality in critical illness. Crit Care. 2014 Mar 24; 18(2): R-47
16. Hoiick MF, Biinkley NC, Bischoff- Ferrari HA, G ordon CM, Hanley DA, Heaney RP, *et al*. Evaluation treatment and prevention of vitamin D deficiency : an Endocrine Socity clinical practice guideline. *J Clin Endocrinol Metab*. 2011 July;96(7):1911-30.

How to cite this article:

Kolathu Parambil Radhika *et al* (2019) 'Serum 25-Hydroxyvitamin d Status in Critically Ill Adult Population in North Kerala, India', *International Journal of Current Advanced Research,* 08(10), pp. 20261-20263.
DOI: http://dx.doi.org/10.24327/ijcar.2019.20263.3952

****