Case Report

BIOMEDICAL Journal of Scientific & Technical Research

ISSN: 2574 -1241

DOI: 10.26717/BJSTR.2021.39.006324

Relationship Between Vitamin D Levels and Covid-19 Severity Due to Circulating SARS-COV-2 Variants in Argentina: A Presentation of Clinical Cases

Maximiliano CARMONA[1], Virna M. MARTÍN GIMÉNEZ[2] and Walter MANUCHA[3,4]*

[1]*Hospital Luis Carlos Lagomaggiore, Ministerio de Salud, Desarrollo Social y Deportes, Gobierno de Mendoza, Argentina*

[2]*Instituto de Investigaciones en Ciencias Químicas, Facultad de Ciencias Químicas y Tecnológicas, Universidad Católica de Cuyo, Sede San Juan, Argentina*

[3]*Laboratorio de Farmacología Experimental Básica y Traslacional. Área de Farmacología, Departamento de Patología, Facultad de Ciencias Médicas, Universidad Nacional de Cuyo, Argentina*

[4]*Instituto de Medicina y Biología Experimental de Cuyo, Consejo Nacional de Investigación Científica y Tecnológica (IMBECU-CONICET), Argentina*

***Corresponding author:** Walter MANUCHA, Farmacología, Depto. Patología. Facultad de Ciencias Médicas. U. N. de Cuyo. Centro Universitario. CP 5500, Mendoza, Argentina

ARTICLE INFO

Received: October 13, 2021

Published: October 25, 2021

Citation: Maximiliano CARMONA, Virna M. MARTÍN GIMÉNEZ, Walter MANUCHA. Relationship Between Vitamin D Levels and Covid-19 Severity Due to Circulating SARS-COV-2 Variants in Argentina: A Presentation of Clinical Cases. Biomed J Sci & Tech Res 39(4)-2021. BJSTR. MS.ID.006324.

ABSTRACT

There is growing evidence that serum vitamin D levels are inversely related to the severity of COVID-19. However, it is not yet known whether this relationship is observed independently of the type of variant of SARS-CoV-2 that has caused the infection or if this is variant-dependent. In this context, we studied a series of clinical cases with a positive diagnosis of COVID-19 and required hospitalization in the unit of critical care at a hospital from Argentina. At the time of this study, the variants of SARS-CoV-2 with the highest circulation in this country were the Lambda (Andina) and Gamma (Manaus) variants. The obtained results would indicate that the inverse relationship studied is evidenced, at least, against infection by the two variants mentioned. However, to deepen this possible relationship against other variants, additional studies should be carried out in populations with a different viral circulation profile.

Keywords: COVID-19; Vitamin D; SARS-CoV-2 Variants; Acute Respiratory Distress Syndrome; Lambda; Gamma

Introduction

During the current pandemic of atypical pneumonia caused by the SARS-CoV-2 coronavirus, it has been observed that vitamin D (VD) deficiency would represent a significant risk factor in the severity and prognosis of COVID-19 with a higher prevalence of hypertension and cardiovascular diseases. As of August 2021, Argentina was the second Latin American country with the highest number of confirmed cases and the fifth with the highest number of deaths from COVID-19, according to official statistics [1], despite having been subjected to one of the longest quarantines of the world, which justifies and strengthens the selection of this country to carry out research works such as the one presented here. Previous studies consider that the weighted average prevalence of VD deficiency in the Argentine adult population is around 43.3% [2]. In this context, the present study aimed to investigate the possible relationship between the evolution of the disease concerning serum VD levels in a series of clinical cases of patients with COVID-19. They were admitted to the critical care area of Hospital Luis Carlos Lagomaggiore, Mendoza, Argentina.

Presentation of the Series of Clinical Cases

We present a series of 5 patients, 2 men and 3 women in an age range of 25 to 86 years, with a positive diagnosis by polymerase chain reaction (PCR) to detect SARS-CoV-2. They all required admission to the critical care unit due to acute respiratory failure and received the standard care recommended to manage this pathology (invasive hemodynamic monitoring, mechanical ventilation, and other procedures). Table 1 shows the clinical cases and the most outstanding variables analyzed. Biochemical/inflammatory parameters were requested (vitamin D, D-Dimer, ferritin, ultrasensitive C-reactive protein, blood count, among others). Likewise, ventilatory mechanics measurements were performed at the time of linkage to mechanical ventilation (MRA). As observed in the series of cases presented, the serum VD levels in all the patients analyzed are below what is established as normal or sufficient levels of VD (> 30 ng/mL), reaching not only levels of insufficiency (<30 ng/mL), but even VD deficiency (<20 ng/mL). Regarding mortality, of the total sample (100%), 2 (40%) patients died. The deceased patients were identified as 3 and 4, and they also had the lowest values in the VD dosage (7.98 ng/mL and 17.3 ng/mL, respectively).

Table 1: Variables were analyzed in the 5 patients belonging to the series of clinical cases studied. Abbreviations: acute respiratory distress syndrome (ARDS), HT (hypertension), BMI (body mass index), TB (smoking), DBT (diabetes), ICU (intensive care unit), PEEP (end-expiratory pressure), MRA (mechanical ventilation), CRP (C-reactive protein), and Mean ± SD (mean ± standard deviation of the 5 patients) for the quantitative variables.

Measured Variable	Patient 1	Patient 2	Patient 3	Patient 4	Patient 5	Mean ± SD
Age	59 years	71 years	25 years	45 years	86 years	57.2±23.49
Sex	Male	Male	Female	Female	Female	
APACHE II	10	18	16.5	8	29	16.25±9.53
Vitamin D	22.7	24.17	7.98	17.3	20,25	18.454±6.40
(ng/mL)						
Need for PRONO	Yes	No	No	Yes	Yes	
MRA Days	5	7	6	12	6	7.2±2.77
BMI	26	22	35	30	31	28.8±4.96
UTI Mortality	No	No	Yes	Yes	No	---------
Comorbilities	Nephectomy HT Mild obesity	HT TB	Hypothyroidism DBT Severe obesity	HT Moderated obesity	TB DBT HT Moderated obesity	--------
ARDS Severity	Severe	Severe	Severe	Severe	Severe	---------
PLATEAU Pressure	27	22	17	14	23	20.6±5.12
Compliance (mL/cm H2O)	18	25	18	27	22	22±4.06
PEEP on Admission (cm H2O)	14	12	14	12	12	12.8±1.09
Dimer D (ng/mL)	300	670	900	490	609	593.8±165.6
Ferritin (ng/dL)	245	504	120	290	324	296.6±123.8
CRP (mg/dL)	180	230	456	309	156	266.2±106.9
White Blood Cells (number/mm^3)	4,180	5,677	12,344	10,988	6,788	5,797±3,190

Discussion

The 5 patients studied showed a significant increase in inflammatory parameters, accounting for the severity of the COVID-19 developed, starring the characteristic cytokine storm. Consistent with our results, some previous studies have suggested the existence of an inverse relationship between serum VD levels and the degree of severity due to COVID-19 [3-8]. However, none of them has specifically evaluated this relationship in patients

affected by the variants of SARS-CoV-2 Gamma (Manaus) and Lambda (Andina), with a majority presence in Argentina at the date of this study [9].Therefore, the importance of this research is fundamentally in that its results would contribute significantly to establish an inverse relationship between serum levels of VD and severity of COVID-19 in patients infected by the variants mentioned above, representing an essential contribution to the genomic surveillance process [10], not only in Argentina, if not in all those countries in the world that are mainly affected by the presence of the Lambda and Gamma variants. This contribution would significantly improve the prevention and treatment of COVID-19, mainly when any of these variants develops the infection. Likewise, additional studies should be performed in populations with another viral circulation profile to evaluate this relationship (VD levels vs COVID-19 severity) versus other SARS-CoV-2 variants.

Authors' Contribution

All authors contributed in the same way in the conception and design of the review, with a substantial contribution on the data, analysis and interpretation of the contents, writing and critical review of the article for its intellectual content.

Declaration of Conflict of Interest

The authors declare no potential conflicts of interest concerning the research, authorship and/or publication of this article.

Financial Support

The authors declare that they have not received financial support for the research, authorship and/or publication of this article.

References

1. (2021) Número de contagios y personas fallecidas a causa del COVID-19 en América Latina y el Caribe al 19 de agosto de 2021.
2. Puche RC (2015) Sobre la prevalencia de hipovitaminosis D en Argentina. Medicina (Buenos Aires) 75(3): 183-186.
3. Martín Giménez VM, Inserra F, Ferder L, García J, Manucha W (2021) Vitamin D deficiency in African Americans is associated with a high risk of severe disease and mortality by SARS-CoV-2. J Hum Hypertens 35(4): 378-380.
4. Martín Giménez VM, Ferder L, Inserra F, García J, Manucha W (2020) Differences in RAAS/vitamin D linked to genetics and socioeconomic factors could explain the higher mortality rate in African Americans with COVID-19. Ther Adv Cardiovasc Dis 14: 1753944720977715.
5. Giménez VMM, Sanz RL, Marón FJM, Ferder L, Manucha W (2020) Vitamin D-RAAS Connection: An Integrative Standpoint into Cardiovascular and Neuroinflammatory Disorders. Curr Protein Pept Sci 21(10): 948-954.
6. Lagadinou M, Zorbas B, Velissaris D (2021) Vitamin D plasma levels in patients with COVID-19: a case series. Infez Med 29(2): 224-228.
7. Pinzon RT, Angela, Pradana AW (2020) Vitamin D deficiency among patients with COVID-19: case series and recent literature review. Trop Med Health 48(1): 102.
8. Ferder L, Martín Giménez VM, Inserra F, Tajer C, Antonietti L, et al. (2020) Vitamin D supplementation as a rational pharmacological approach in the COVID-19 pandemic. Am J Physiol Lung Cell Mol Physiol 319(6): L941-L948.
9. (2021) No se detectaron las variantes Beta y Delta en individuos sin antecedente de viaje al exterior o contacto estrecho con viajeros.
10. Márquez S, Prado Vivar B, José Guadalupe J, Becerra Wong M, Gutierrez B, et al. (2021) SARS-CoV-2 genome sequencing from COVID-19 in Ecuadorian patients: a whole country analysis. medRxiv.

ISSN: 2574-1241

DOI: 10.26717/BJSTR.2021.39.006324

Walter MANUCHA. Biomed J Sci & Tech Res