RESEARCHERID
THOMSON REUTERS

[*Tarigan * et al., 6(8): August, 2019*] ISSN: 2349-5197
Impact Factor: 3.765

INTERNATIONAL JOURNAL OF RESEARCH SCIENCE & MANAGEMENT

CORRELATION BETWEEN SERUM VITAMIN D LEVELS AND CURB 65 ADMISSION IN PATIENTS WITH COMMUNITY ACQUIRED PNEUMONIA AT THE START OF HOSPITAL

Pulung Tarigan*[1], Alwinsyah Abidin[2] & Zuhrial Zubir[3]

[*1]Departement of Internal Medicine,Faculty of Medicine Universitas Sumatera Utara

[2]Division of Pulmonologi, Departement of Internal Medicine,Faculty of Medicine Universitas Sumatera Utara

[3]Division of Alergy-Immunology, Departement of Internal Medicine,Faculty of Medicine Universitas Sumatera Utara

DOI: 10.5281/zenodo.3365418

Keywords: Community acquired pneumonia, CURB-65, vitamin D.

Abstract

Introduction : Pneumonia is still a major cause of morbidity and mortality worldwide.[1] World health organization (WHO) predicts there are 429.2 million morbidity and 94.5 million disability figures due to pneumonia.[2] Community-acquired pneumonia is the most common and serious type of pneumonia, and become the most common infectious diseases. Community-acquired pneumonia also causes the most deaths and morbidity in the world.[1] Pneumonia become one of top 10 hospitalizations in hospitals. CURB-65 (Confusion, Blood urea nitrogen, Respiratory rate, Blood pressure, Age> 65 years) are validated predictors and widely known in determining the degree of pneumonia in various countries. Besides the classic function in maintaining the balance of calcium and phosphate. Vitamin D also has immune modulating properties. Some study have proved the relationship between lack of vitamin D levels in serum with an increase in airway infections.

Aim: To evaluate the correlation between Vitamin D level in serum with CURB-65 value in community acquired pneumonia patients at the start of hospital.

Methods: This study used cross sectional study in 54 patients with community acquired pneumonia at Haji Adam Malik General Hospital, Medan, North Sumatera. Community acquired pneumonia was established through clinical and radiological examination (chest x-ray). CURB-65 uses 5 clinical variables: Confusion, Blood urea nitrogen> 7 mmol / L (> 20 mg / dL), respiratory rate> 30 / minute, systolic blood pressure (<90 mmHg) or diastolic (<60mmHg), and age> 65 years. Total vitamin D levels in serum was determined by Enzyme-Linked Fluourescent Assay (ELFA) method (MINI VIDAS BRAHMS). . Data were collected and analyzed using SPSS version 23.

Results : 54 patien with community acquired pneumonia,24 people vitamin D ≤ 2 (44,4 %) and 30 people vitamin D> 2 (55,6%). 34 people CURB-65≤ 2 (63%) and 20 people CURB-65 > 2 (37%).There is a significant association between Vitamin D Score CURB 65 with a value of p = 0.020.

Conclusions: There was statistically significant relationship between vitamin D and score CURB-65(p= 0,020) and a negative moderate correlation between vitamin D levels and the CURB-65 score (p = 0.016; r = -0.332)

Introduction

Pneumonia is defined as an acute inflammation of the lung parenchyma caused by microorganisms (bacteria, viruses, fungi, parasites). Community acquired pneumonia is a type of pneumonia are the most common and serious nature, and is one of the infectious diseases which are prevalent and also the cause of death and morbidity most in the world.[1]Pneumonia including community pneumonia ranks 3rd of 30 causes of death in the world, and is an infectious disease that often leads to death in the develop country.[1,2,8] The importance of the patient's initial assessment led to the development of community pneumonia severity scoring system in patients with community pneumonia. Various predictors have been developed and tested in various countries. PSI (pneumonia severity index) and CURB-65 (Confusion, Blood urea nitrogen, Respiratory rate, Blood pressure, Age> 65 years) is a predictor that has been validated and is widely recognized in determining the degree of pneumonia community in various countries. Both of these predictors aims to stratify patients based on the degree of disease community pneumonia acquired in scoring through several clinical variables and mortality associated with the risk level for 30 days and decide where maintainability on pasien.[3,9]

Vitamin D in addition to its classic function as maintaining the balance of calcium and phosphate, vitamin D also has immune modulating properties. Vitamin D also has an interest in the innate and adaptive immune responses, in this case produce antimicrobial peptides (β-defensins, cathelicidin). Some studies show a positive correlation between levels of vitamin D in serum 25-hydroxyvitamin D (25OHD) with the severity of chronic diseases including pneumonia community, where low levels of vitamin D that will lead to the severity of the pneumonia community. Serum levels of vitamin D are low related to the death of 30 days (30 days mortality) in patients with community pneumonia in the hospital. It is associated with innate immune response and adapt if. Many studies have shown a link between levels of vitamin D deficiency in serum with increased pulmonary infections .[4,10]

Study by remmelts et al, vitamin D deficiency associated with poor outcomes in pneumonia related to the community and CURB-65 score , while research Mamani et al stated low levels of vitamin D associated with incidence of community acquired pneumonia but not related to the CURB-65.Deficiency of vitamin D and higher of CURB 65 score as a predictor of 30-days mortality.4 We predict that there is a relationship between vitamin D deficiency and increased CURB 65 score in produce a worse prognosis in pneumonia community.

Method

This research uses analytical research methods with cross sectional study design. The research was conducted at thes General Hospital Haji Adam Malik Medan. The data collection obtained from inpatients and outpatients with a diagnosis of CAP in Haji Adam Malik Hospital that existed from May 2018 until May 2019. For exclusion criteria are tuberculosis, chronic kidney disease, chronic liver disease, diabetes mellitus, chronic lung disease, astma, malignancy, HIV, Patient are not taking supplement containing vitamin D and calcium for last 3 months. 'The samples were taken with total sampling technique and processed using statistical software.

Result

This study was followed by 54 patients who meet the inclusion and exclusion criteria with a mean age in this study was 44.02 years, In this study, 32 patients (59.3%) were male and 22 patients (40, 7%) are women. Results CURB-65 scoring calculation on this research, shows the median value score 2, with the majority of the study population classified in the lower group (CURB-65 score ≤ 2), as many as 34 people (63.0%), and 20 (37.0%) belonging to the higher group (score CURB -65 > 2). Serum vitamin D levels in each patient with the results mean vitamin D level was 21.93 ng / ml. Levels of vitamin D will be divided into two groups: low vitamin D (vitamin D≤20 ng / ml) and normal vitamin D group (vitamin D> 20 ng / ml). In this study, low vitamin D group consists of 24 people (44.4%) and normal vitamin D group of 30 people (55.6%). (Table 4.1)

Table 1. Characteristics of Research Subjects

Characteristics	**n (%)**
Age,	44.02 + 15.15
Gender	
Man	32 (59.3)
Woman	22 (40.7)
Tribe	
Karo	15 (27.8)
Vagabond	23 (42.6)
Java	16 (29.6)
Marital status	
Married	50 (92.6)
Single	4 (7.4)
Work	
Housewife	9 (16.7)
Entrepreneur	32 (59.3)

Farmer	13 (24.1)
Education	
Junior High School	5 (9.3)
Vocational High School	4 (7.4)
Senior High School	39 (72.2)
Bachelor Degree	6 (11.1)
Curb 65B	2 (1-4)
1	14 (26.0)
2	20 (37.0)
3	12 (22.2)
4	8 (14.8)
Curb group 65	2 (1-4)
Low (≤ 2)	34 (63.0)
High (> 2)	20 (37.0)
Vitamin D, ng / ml	21.93 + 7.19
Low (<20)	24 (44.4)
Normal (> 20)	30 (55.6)

A: mean + standard deviations; b: median (minimum-maximum)

In this study, we examine the relationship of vitamin D against CURB score 65 with Chi Square test with the result that there is a significant relationship between Vitamin D Score CURB 65 with a value of p = 0.020.

Table 2. Basic characteristic data relationships to Score CURB65

variables	**Score CURB65, n (%)**		***p***
	≤ 2 (Low)	**> 2 (High)**	
Age			0,014
Gender			
Woman	14 (25.9)	8 (14.8)	0.932
Man	20 (37.1)	12 (22.2)	
Tribe			
Karo	7 (12.9)	8 (14.8)	0.319
vagabond	16 (29.6)	7 (12.9)	
Java	11 (20.3)	5 (9.2)	
Marital status			
Married	31 (57.4)	19 (35.2)	0.525
Single	3 (5.6)	1 (1.8)	
Work			
Housewife	5 (9.2)	4 (7.4)	.248
entrepreneur	23 (42.6)	9 (16.6)	
farmer	6 (11.1)	7 (12.9)	
Education			
Junior High School	4 (7.5)	1 (1.8)	0.819
Vocational High School	2 (3.7)	2 (3.7)	

Senior High School	24 (44.4)	15 (27.7)	
Bachelor Degree	4 (7.5)	2 (3.7)	
Vitamin D, mg / ml			0,020
Low (<20)	11 (20.3)	13 (24.1)	
Normal (> 20)	23 (42.7)	7 (12.9)	

In this study, the correlation test conducted on vitamin D levels on CURB Score 65. Pearson correlation test was conducted with the result there is a negative correlation statistically significant between levels of vitamin D to the CURB-65 score with the strength of the correlation was (p = 0.016; r = - 0.327). (Table 3)

Table 3.Correlation levels of vitamin D to Score CURB65

variables	**ScoreCURB65**	
	P	**r (correlation)**
vitamin D	0,016	-0.327

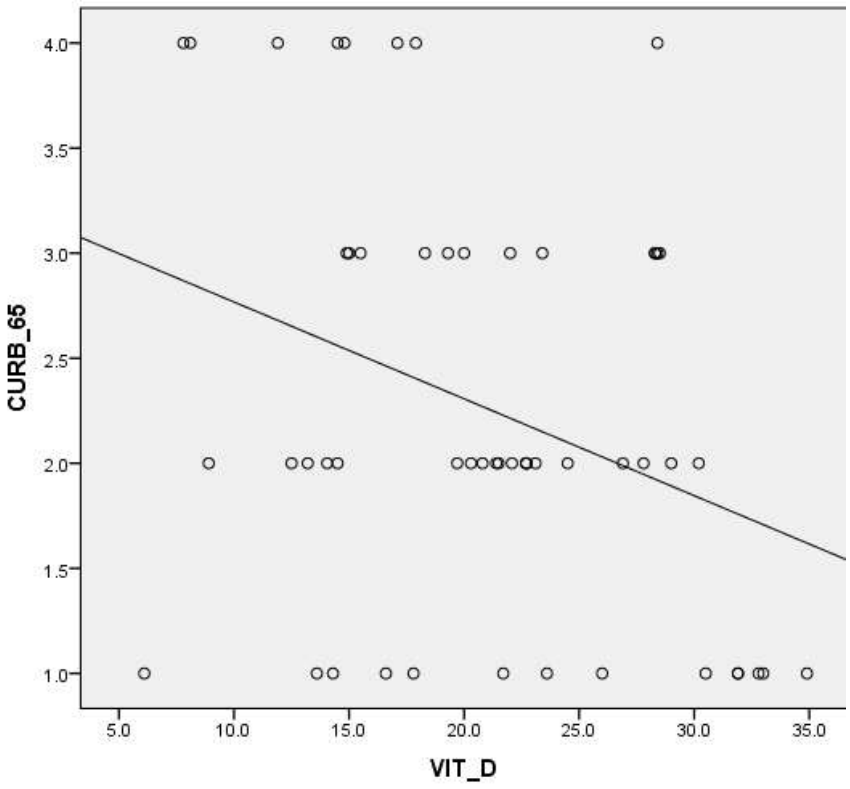

Figure 1. Scatter plots levels of vitamin D to CURB65 score

From the results of this study showed that men more suffer than women in community acquired pneumonia that is 59.3%, and 40.7%. These results are also in accordance with previous research studies, research on Mathias w. Pletz et al reported that male more suffer from community acquired pneumonia compared to female.[5] Fatemeh Talebi et al in Tehran Iran reported that community pneumonia is more common in males than females

57.8% .[6] Study by Mojgan Mamani reported in iran shows that male had developed more in community acquired pneumonia (69.9%) than women.[7]

Vitamin D serum levels in this study had an average result 21.93 ng / ml. Mojgan Mamani on research has a mean vitamin D results of 21.96 ng / ml for group pneumonia, while 119.31 ng / ml for the control group. In this study there is a difference Mamani serum levels of vitamin D between the two kelompok.36 In this study, the mean serum level of vitamin D was higher in women 21.86 ng / ml compared to men 20.454 ng / ml. This is in line with research conducted by Fatemeh talebi et.al where the results of the acquired value of the mean serum levels of vitamin D in women was 29.49 ng / ml compared with men was 20.75 ng / ml.[6]

In this study the relationship of vitamin D with a score CURB 65 performed Pearson correlation test with significant results between vitamin D with a score CURB 65 with the result there is a negative correlation statistically significant between levels of vitamin D to Score CURB-65 with the strength of the correlation was ($p = 0.016$; $r = -0.327$). Remmelts et al in 2012 with a sample of 73 people at its research to get the result that there are differences in the value of vitamin D CURB65 groups of high and low statistical significance ($p = 0.01$). Other studies Pletz et al 2014 with a total of 300 samples declare the result that there is a significant negative correlation between the levels of the vitamin D CURB65 ($p = 0.011$) 34. However, research conducted Mojgan Mamani et al 2017 in iran states obtain poor results in line with this research. In a study with 73 samples Mojgan Mamani community pneumonia divided into 4 categories namely the vitamin D group were severe vitamin D deficiency (<10 ng / ml), vitamin D deficiency group were moderate (10-20 ng / ml), vitamin D insufficiency group (21-29 ng / ml) and sufisien vitamin D group (≥ 30 ng / ml), the result that there is no relationship between the CURB 65 with the overall levels of vitamin D group ($p = 0.120$). But in this Mamani study are significant results regarding the relationship with the group CURB65 severe vitamin D deficiency (<10 ng / ml) alone ($p = 0.018$) .36 vitamin D insufficiency group (21-29 ng / ml) and sufisien vitamin D group (≥ 30 ng / ml), the result that there is no relationship between the CURB 65 with the overall levels of vitamin D group ($p = 0.120$). But in this Mamani study are significant results regarding the relationship with the group CURB65 severe vitamin D deficiency (<10 ng / ml) alone ($p = 0.018$) .36 vitamin D insufficiency group (21-29 ng / ml) and sufisien vitamin D group (≥ 30 ng / ml), the result that there is no relationship between the CURB 65 with the overall levels of vitamin D group ($p = 0.120$). But in this Mamani study are significant results regarding the relationship with the group CURB65 severe vitamin D deficiency (<10 ng / ml) alone ($p = 0.018$) .[7]

Result insignificant of research Mojgan Mamani et al probably due to not-determined etiology cause of pneumonia (bacterial or viral or both) when looking for a relationship with a group of vitamin D deficiency and several sample did not remember whether supplement use additional for research so as to bias the results above.

Conclusion

Based on the results and discussion on this research that there is a statistically significant correlation between levels of vitamin D with CURB-65 and there is a negative correlation statistically significant between levels of vitamin D to the CURB-65 score with the strength of the correlation was.

References

[1] Cahyarini,Harsini,Irvan Medison et. Al Pneumonia Komunitas. Pedoman Diagnosis Penatalaksanaan Di Indonesia. 2014.
[2] Brown SM, Jones JP, Aronsky D, et al. Relationships among initial hospital triage, disease progression, and mortality in community acquired pneumonia. Respirology. 2012; 17 (8): 1207-13.
[3] Moghaddam MA, Bakhshi H, Rezaei B, et al. Compared to pneumonia severity index CURB-65 in predicting the outcome of community acquired pneumonia among Patients Referred to an Iranian emergency department: a prospective study. The Brazilian J of Infect Dis. 2012; 17 (2): 179-83.
[4] Remmelts HH, Van De GardeEM, Meijvis SC, Peelen EL, Damoiseaux JG, Grutters JC, et.al. Addition of vitamin D status to prognostic scores improves the prediction of outcome in community acquired pneumonia. ClinInfect Dis. 2012; 55: 1488-94
[5] Pletz MW, Terkamp C, Schumacher U, et al. Vitamin D deficiency in

community acquired pneumonia: low levels of 1,25 (OH) 2 D are associated with disease severity. Respir Res. 2014; 15: 53.

[6] Fatemeh Talebi, Mehrnaz Rasooli Nejad, Mehdi Yaseri, Azar Hadadi. Association of vitamin D status with the severity and mortality of community-aquaired pneumonia in Iran during 2016-2017: A Prospective Cohort Study.Reports of Biochemistry & Molecular Biology Apr 2019; Vol.8, No.1

[7] Mojgan Mamani, Neda Muceli, Hamid Reza Ghasemi Basir, et.al. Association between serum concentration of 25-hydroxyvitamin D and community-aquaired pneumonia: a case-control study. International Journal of General Medicine, 13th November 2017.

[8] Mbata, GJ, Chukwuka CJ, Onyedum, C, Onwubere, BJ. The CURB-65 scoring system in severity assessment of eastern nigerian Patients with community acquired pneumonia: a prospective observational study. Primary Care Respiratory Journal. , 2013; 22 (2): 175-180.

[9] Ramirez JA. Community Acquired Pneumonia. J Infect Dis and Antimicrobial Ag. Available at:http://www.antimicrobe.org/e55.asp [Accessed May 2017]

[10] Mandell LA, Wunderink RG, Anzueto A, et al. Infectious diseases society of America / American Thoracic Society consensus guidelines on the management of community acquired pneumonia in adults. Infectious Dis Clin. 2007; 44: 30-35 Supp.