

# Some Comments for Better Understanding of the Study Entitled “Reduced Vitamin D Levels are Associated with Stroke-Associated Pneumonia in Patients with Acute Ischemic Stroke” [Letter]

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Gulistan Bahat <sup>1</sup>  
Serdar Ozkok <sup>1</sup>  
Savaş Ozturk <sup>2</sup>  
Mehmet Akif Karan<sup>1</sup>

<sup>1</sup>Istanbul University, Istanbul Medical School, Department of Internal Medicine, Division of Geriatrics, Istanbul, Turkey;  
<sup>2</sup>Istanbul Haseki Training and Research Hospital, Department of Internal Medicine, Istanbul, Turkey

## Dear editor

We have read the article by Huang et al with great interest.<sup>1</sup> Authors aimed to reveal the relationship between serum vitamin D levels and stroke-associated pneumonia (SAP). They measured the serum vitamin D levels of the acute ischemic stroke (AIS) patients within 24 hrs of admission and divided them into three groups accordingly. Compared to the patients without SAP, patients with SAP had significantly lower vitamin D levels. The prevalence of SAP was higher in the vitamin D deficient group. In the logistic regression analysis, it was detected that vitamin D deficiency and insufficiency were independently associated with SAP.

This study is an important contribution to the literature and we congratulate the authors. We have some comments regarding the study analyses. Firstly, the authors mentioned about the anti-inflammatory effects of vitamin D and hypothesized that a reduction of vitamin D level might be associated with the occurrence of SAP due to its reduced anti-inflammatory effect. The anti-inflammatory effect of vitamin D is important for many autoimmune diseases or low-level inflammatory conditions like obesity or cardiovascular diseases.<sup>2</sup> In other words, sufficient levels of vitamin D would be helpful in regards to protection from the situations stated above. However, an increased likelihood of infections in vitamin D deficiency is basically caused by the decreased effect of vitamin D on promoting protective immunity. Vitamin D plays an important role in the innate antimicrobial response, and deficiency of it causes increased susceptibility to infections.<sup>3</sup> Hence, one can suggest that a reduction of vitamin D level might be associated with the occurrence of SAP due to its “reduced effect on promoting protective immunity”, instead of “reduced anti-inflammatory effect”.

Secondly, dysphagia was one of the baseline clinical parameters stated in the methods section, but how it was detected is important and was not mentioned. Was it detected by a validated tool or by examination or just by asking about it? And was it present before stroke event or developed after? Actually, dysphagia history before admission might be a cause for malnutrition and vitamin D deficiency and, therefore may be an underlying factor for the relationship between vitamin D deficiency

Correspondence: Gulistan Bahat  
Tel +90 212 414 20 00 Ext. 31478  
Email gbahatozturk@yahoo.com

and SAP. This data should be clarified, and if there is no data on dysphagia history before admission, this should be stated as a limitation of the study. Furthermore, patients' nutrition status should also be mentioned. Malnutrition itself can be the cause of vitamin D deficiency and the factor related to SAP. Therefore, if the nutrition status of patients was evaluated, the data should be given, and if not, we suggest that it should also be stated as a limitation of the study.

In addition, the authors noted that the increase in the incidence of diabetes with the decrease of vitamin D level is an interesting finding. In fact, there is mounting evidence about the inverse relationship between vitamin D status and diabetes mellitus or insulin resistance.<sup>4,5</sup> Therefore, the increasing prevalence of diabetes with decreasing vitamin D levels is an expected finding.

## Disclosure

The authors report no conflicts of interest in this communication.

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