Vitamin D, Innate Immunity and Outcomes in Pneumonia and Exacerbations of COPD

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Abstract

Background: Vitamin D has been shown to regulate the production of the antimicrobial peptides human cathelicidin and human beta defensin-2. These peptides play an important role in the innate immune response to infection.

Objectives: To observe the associations between vitamin D deficiency, serum antimicrobial peptide levels and outcomes in patients admitted with community acquired pneumonia and exacerbations of Chronic Obstructive Pulmonary Disease. (COPD)

Methods: A prospective study of 185 patients admitted with pneumonia or exacerbations of COPD during the winter of 2008. We investigated associations between mortality at 30 days and serum levels of 25-hydroxyvitamin D, cathelicidin, and beta defensin-2.

Results: Severe 25-hydroxyvitamin D deficiency (<30nmol/L) was common in this population (17%) and was associated with a higher 30-day mortality. Lower cathelicidin levels were also independently associated with higher 30-day mortality. These associations persisted after adjusting for age, sex, diagnosis (pneumonia or COPD), severity of the acute illness (Confusion, Urea, Respiratory rate, Blood pressure, and Age over 65), and co-morbidities. However, 25-hydroxyvitamin D levels were not correlated with either serum cathelicidin or beta defensin-2.

Conclusions: In patients admitted to hospital with pneumonia and exacerbations of COPD during the winter months in New Zealand, severe 25-hydroxyvitamin D deficiency and lower serum cathelicidin levels were independently associated with increased 30-day mortality. Contrary to our hypothesis, serum 25-hydroxyvitamin D levels were not associated with serum levels of the antimicrobial peptides cathelicidin or beta defensin-2.