CRITICAL CARE

LETTER

Th17 mediators and vitamin D status

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See related research by Bermejo-Martin *et al*., http://ccforum.com/content/13/6/R201

In their study on Th1 and Th17 hypercytokinemia in severe pandemic influenza, Bermejo-Martin and colleagues [1] observed significantly elevated levels of IL-17 and particularly IL-6 in critically ill patients. They also reported that up to 50% of critical care patients studied were obese.

Correale and colleagues [2] indicate that activated vitamin D enhances the development of IL-10-producing cells and reduces the number of IL-6- and IL-17-secreting cells. Studies show that obese and overweight individuals are more likely to have an inadequate vitamin D status [3,4]. According to Louie and colleagues [5], diabetes and obesity were the most frequently identified underlying conditions in fatal pandemic 2009 influenza A (H1N1) infection cases older than age 20 years worldwide. In addition, obese people usually have high calorie and low nutritional value diets. Aasheim and colleagues [6] showed that low concentrations of vitamin B-6, vitamin C, 25-hydroxyvitamin D, and vitamin E adjusted for lipids are prevalent in morbidly obese Norwegian patients seeking weight-loss treatment.

It would be interesting to see if any of the critical cases observed in the study by Bermejo-Martin and colleagues were insufficient or deficient in vitamin D and/or other nutrients relevant for intracellular signaling involved in inflammation. If vitamin D plays a role in human general capacity to deal with infection and other diseases, then an increase in Th17 mediators in severe pandemic influenza patients could be, at least in part, related to vitamin D insufficiency/deficiency.

Authors' response

Jesus F Bermejo-Martin and the SEMICYUC H1N1 working group

We appreciate Dr Krstić's comment on our article on Th1-Th17 hypercytokinemia in severe pandemic influenza, recently published in *Critical Care*. Dr Krstić points to deficiency of vitamin D as a potential actor in the disregulation of the immune response to the new virus. In our opinion, this could represent a new avenue to be explored in the pathogenesis of the disease. Nonetheless, some questions come to mind. If obesity is related to a deficient state of vitamin D, and, as a consequence, this deficiency could influence the inflammatory response to the virus, higher numbers of critically ill H1N1 patients should be observed in western countries, where obesity is widely present. Other countries should also account for increased numbers of critical patients due to vitamin D deficiency: developing countries or those with limited exposure to sun light are two examples. So far, data do not seem to support an overwhelming increased incidence of severe H1N1 disease in these nations. In our view, vitamin D deficiency could be involved in the genesis of severe influenza disease, but host factors, such as key polymorphisms in the genes responsible for the response to the virus, are the major players in this disease [7], probably combined with the presence of altered physiological states (increased release of proinflammatory mediators from adypocytes in obese patients [8], immune dysregulation in pregnancy [9], mucosal inflamation in chronic obstructive pulmonary disease and smokers [10], and so on). Vitamin D should thus be considered in the context of a wider spectrum of factors influencing severe disease.

Competing interests
The authors declare that they have no competing interests.

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