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LETTER

Possible Associations of Vitamin D, Vitamin D-Binding Protein, and Vitamin D Receptor with Diabetic Neuropathic Pain and Balance [Letter]

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Dear editor

We read with great interest the article recently published in Journal of Pain Research by Sari et al,[1] examining the effect of vitamin D replacement therapy on neuropathic pain and imbalance in patients with diabetic neuropathy (DN). They found that vitamin D replacement reduced neuropathic pain and improved balance scores in patients with DN. They suggested that a vitamin D replacement schedule might be planned in diabetic patients with vitamin D deficiency in order to resolve neuropathic pain and balance problems. However, we would like to add some points which may be taken into consideration.

We have also published a study showing the decreased serum vitamin D levels in patients with DN.[2] In agreement with the study by Sari et al, vitamin D deficiency was more common in diabetics with distal symmetrical polyneuropathy. This may be explained by the neurotrophic effects of vitamin D on nerve function.[1] However, another explanation might be the nociceptor repair function for vitamin D, which elevates the pain threshold.[3] Differently, we investigated the serum levels of vitamin D-binding protein (VDBP) and vitamin D receptor (VDR) as well. VDBP, secreted by the liver, is essential for vitamin D metabolism. It functions as a specific transporter of circulating vitamin D metabolites, including 25-hydroxy vitamin D (circulating reservoir) and 1,25-hydroxy vitamin D (active form).[2] It has been suggested that the different VDBP variants bind the diverse vitamin D metabolites with varying affinity, thereby affecting the amount of intracellular vitamin D in beta cells.[4] Additionally, activated vitamin D functions by binding to a nuclear receptor, the VDR. Data have demonstrated that VDR is expressed in many tissues, including those involved in the regulation of glucose metabolism, such as muscle-in association with balance- and pancreatic beta cells.[4] In our study, we found the serum VDBP and VDR levels similar in patients with DN compared with those without DN.[2] This may be explained that vitamin D influences a broader range of metabolic systems by complex signaling pathways via both genomic and non-genomic courses outside the cell nucleus.[4]

Taken together, it seems that vitamin D, VDBP and VDR share complex mechanisms in the development of DN. In this respect, levels of VDBP and VDR at baseline and after vitamin D supplementation may give insight to evaluate the contributions of these proteins in the management of DN.

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Disclosure

The author reports no conflicts of interest in this communication.

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