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The Many Forms and Functions of Essential Vitamin D for Dialysis Patients

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Introduction/Overview

THE SCREENING AND treatment of vitamin D deficiency is now routinely done in most dialysis clinics. Many dialysis patients have suboptimal levels of serum 25-hydroxyvitamin D and require vitamin D supplementation even in clinics located in the tropics.

Convincing patients to take a vitamin D supplement has been a challenge, however.[1] Barriers to vitamin D supplementation include confusion about different forms of vitamin D,[2] the lack of knowledge regarding the benefits of adequate vitamin D levels, resistance to an increased daily pill burden, and the potential out-of-pocket cost for "another pill."

Many patients believe that the vitamin D analog (e.g., oral calcitriol, Hectoral, or Zemplar) they receive in the dialysis clinic is sufficient to address their low serum 25-hydroxyvitamin D level. Their confusion is understandable on the basis of the umbrella term "vitamin D" that is commonly used to refer to the various forms of this hormone-like vitamin in the lay literature and among members of the health team. For example, medical professionals mistakenly tell patients "this is vitamin D" when they administer a vitamin D analog instead of the more accurate "this is an *analog of 1,25-dihydroxy*vitamin D."

Requesting patients to add another pill to their daily medication routine is another challenge. In the Transtheoretical Model of Change,[3] knowledge of the benefit of a new behavior, or the risk of not adopting a new behavior, empowers a patient to make a behavior change. Therefore, a summary of the benefits of supplemental vitamin D2 (ergocalciferol) or vitamin D3 (cholecalciferol) and the risks associated with low serum 25-hydroxyvitamin D levels[4] would help patients more easily surmount their resistance to an increased pill burden and out-of-pocket costs. However, such a patient-friendly summary of the benefits and risks has not been readily available for patient education.

Thus, a 1-page handout was developed to aid in the education of dialysis patients receiving vitamin D supplementation. This patient education handout uses a schematic diagram to illustrate the relationship between the different forms and functions of vitamin D.

Providing additional information such as a list of dietary sources of vitamin D to further explain the difficulty in consuming adequate amounts through food and a list of acceptable vitamin D products available in their respective communities to this 1-page educational handout may be helpful.

Websites

- **Vitamin D in CKD population:**

KDIGO Clinical Practice Guideline for the Diagnosis, Evaluation, Prevention, and Treatment of Chronic Kidney Disease-Mineral and Bone Disorder (CKD-MBD). Chapter 4.2: Treatment of abnormal PTH levels in CKD-MBD. *Kidney Int*. 2009;76(suppl 113):S50-S99. http://www.kdigo.org/guidelines/mbd/guide4.html#chap4.2

KDOQI Clinical Practice Guidelines for Bone Metabolism and Disease in CKD, Guideline 7. Prevention and treatment of vitamin D insufficiency and vitamin D deficiency in CKD patients. http://www.kidney.org/professionals/kdoqi/guidelines_bone/guide7.htm

- **General information on vitamin D in health (e.g., functions, dietary sources):**

Office of Dietary Supplements, National Institutes of Health. http://ods.od.nih.gov/factsheets/VitaminD-HealthProfessional/#h3

Linus Pauling Institute. Micronutrient research for optimum health–vitamin D. http://lpi.oregonstate.edu/infocenter/vitamins/vitaminD/

- **List of dietary sources of vitamin D:**

Vitamin D (IU) content of selected foods per common measure, sorted by nutrient content. USDA National Nutrient Database for Standard Reference, Release 25. https://www.ars.usda.gov/SP2UserFiles/Place/12354500/Data/SR25/nutrlist/sr25w324.pdf

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References

1. KDIGO Clinical Practice Guideline for the Diagnosis, Evaluation, Prevention, and Treatment of Chronic Kidney Disease-Mineral and Bone Disorder (CKD-MBD). Chapter 4.2: Treatment of abnormal PTH levels in CKD-MBD. *Kidney Int*. 2009;76(suppl 113):S50-S99.

2. Blair D, Byham-Gray L, Lewis E, McCaffrey S. Prevalence of vitamin D [25(OH)D] deficiency and effects of supplementation with ergocalciferol (vitamin D2) in stage 5 chronic kidney disease patients. *J Ren Nutr.* 2008;18: 375-382.

3. Substance Abuse and Mental Health Services Administration. General information and links on stages of change and motivational interviewing. http://www.samhsa.gov/co-occurring/topics/training/change.aspx. Accessed May 13, 2013.

4. Joao Matias P, Jorge C, Ferreria C, et al. Cholecalciferol supplementation in hemodialysis patients: effects on mineral metabolism, inflammation, and cardiac dimension parameters. *Clin J Am Soc Nephrol*. 2010;5:905-911.