Vitamin D in Older Patients With Cancer

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Vitamin D insufficiency has been found to be as high as 75% among community-dwelling adults aged 65 and older (Hintzpeter, Mensink, Thierfelder, & Scheidt-Nave, 2007). People aged 70 and older have about 25% less capacity for vitamin D production compared to younger adults (Holick, Matsuoka, & Wortsman, 1989). Insufficient vitamin D levels may have considerable effect on cancer-related diagnosis and treatment (Beer & Myrthue, 2006; Grant & Garland, 2006; Pelczynska et al., 2006; Sieg, Sieg, Dreyhaupt, & Schmidt-Gayk, 2006). Vitamin D also has been found to reduce the risk of premenopausal breast cancer (Abbas, Linseisen, & Chang-Claude, 2006) and has been associated with a decrease in total mortality in the general population (Autier & Gandini, 2007). Other benefits of vitamin D include reduced falls, reduced injury from falls, and enhanced functional status. This research synthesis will consider the issue of vitamin D as related to normative aging, cancer diagnoses, treatment, functional status, and falls in older patients with cancer.

Definition of Vitamin D

According to the National Institutes of Health (NIH, 2005), vitamin D is a fat-soluble substance that is derived from exposure to sunlight. Vitamin D frequently is identified as a vitamin; however, some researchers suggest it is a hormone because manufacturing takes place through sun exposure (Mosekilde, 2005; Wootton, 2005). Several different forms of vitamin D exist, including cholecalciferol (D3) (NIH) and ergocalciferol (D2). Cholecalciferol is made in the skin of animals and people (Holick, 2005). Vitamin D is manufactured in the skin after sunlight exposure; cholecalciferol binds to the vitamin D binding protein and is transported to the liver where it is hydroxylated into 25-hydroxy vitamin D (25 OHD) (Wootton) (see Figure 1). The 25 OHD then travels to the kidney where it is hydroxylated to 1,25 OH2D (Mosekilde). Ergocalciferol is a plant form of vitamin D3 (Holick) that goes through the same hydroxylation as cholecalciferol (Wootton); 25 OHD often is referred to as calcidiol and 1,25 OH2D is known as calcitriol (Boonen, Vanderschueren, Haentjens, & Lips, 2006; Wootton). When comparing supplementation with calciferol (D2) or calcitriol (D3), calciferol was shown to be less potent and have a shorter duration of action when compared to calcitriol (Armas, Hollis, & Heaney, 2004).

Vitamin D generally is obtained in the diet by consuming fish, fish oils, and egg whites. D2 and D3 generally are used as supplementation in milk, bread, and multivitamins (Holick, 2005). The daily requirement of vitamin D is 600 IU (American Dietetic Association [ADA], 2006). However, higher doses of D3 seem to be necessary to reach the desirable health benefits through the same hydroxylation as cholecalciferol (Wootton); 25 OHD often is referred to as calcidiol and 1,25 OH2D is known as calcitriol (Boonen, Vanderschueren, Haentjens, & Lips, 2006; Wootton). When comparing supplementation with calciferol (D2) or calcitriol (D3), calciferol was shown to be less potent and have a shorter duration of action when compared to calcitriol (Armas, Hollis, & Heaney, 2004).

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