**Medical Nutrition Therapy Nutrient**

1. **What is the nutrient?**

The nutrient is vitamin D.

1. **What is the RDA/DRI for the nutrient?**

The RDA for vitamin D is 5 μg/day for infants through male and female adults until age 50. For 51-70 year old males and females, the RDA is 10 μg/day. For males and females age 70 and up, the RDA for vitamin D per day is 15 μg/day. Pregnant and lactating women require 5 μg/day of vitamin D.

1. **How is the nutrient metabolized?**

Vitamin D is metabolized beginning in the skin. 7-dehydrocholesterol is absorbed through the skin from the sun. It is then converted to vitamin D3 once it has been absorbed in the skin. Vitamin D3 then is activated in the liver to produce 25(OH)D3, which then is converted to 1,25(OH)2D3 in the kidney when activated by the parathyroid hormone. This produces 1,24,25,(OH)3D3, which is then oxidized and ready for absorption. Excreted vitamin D is found in the form of calcitroic acid. (NIH, 2011).

1. **What are food sources of the nutrient?**

Common sources of vitamin D include fatty fish such as salmon, tuna, and mackerel, and fish liver oils. There are small amounts of vitamin D in beef liver, cheese, and egg yolks. Fortified foods provide most of the vitamin D in the American diet such as milk, cheese, ice cream, ready-to-eat breakfast cereals, most orange juice, yogurt, and margarine. Infant formula is also fortified with vitamin D. (NIH, 2014).

1. **What disease states alter the nutrients metabolism?**

Disease states that may alter the nutrient metabolism of vitamin D include liver disease, kidney disease, and any gastrointestinal diseases such as Crohn’s Disease or celiac disease. Any disease that may alter calcium or parathyroid hormone levels will also alter the metabolism of vitamin D. (Nelms, 2011).

1. **What are the tests or procedures to assess the nutrient level in the body?**

Tests to identify the amount of vitamin D would a 25-hydroxy vitamin D test that can be detected through a blood test. A level of 20-50 ng/mL is considered the normal range. Deficiency is indicated at a level less than 12 ng/mL. Other indicators of vitamin D deficiency may be muscle, bone, or joint pain, fatigue or muscle weakness, and osteomalacia or rickets. (Nelms, 2011).

1. **What is the drug –nutrient interactions?**

Drug nutrient interactions with vitamin D include:

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| **Estrogen** | Hormone replacement therapy appears to increase the vitamin D levels in the blood; therefore, vitamin D supplements should not be taken. |
| **Isoniazid (INH)** | Used to treat tuberculosis; may raise blood levels of vitamin D. |
| **Thiazide** | A diuretic that increases the activity level of vitamin D. Levels of vitamin D may be decreased. |
| **Antacids** | Prolonged intake of antacids may alter the levels, metabolism, and availability of vitamin D. |
| **Calcium Channel Blockers** | May decrease the production of vitamin D. |
| **Cholestyramine** | Interferes with fat soluble vitamins, including vitamin D. |
| **Phenobarbital, phenytoin, and other anticonvulsant** | May accelerate the body’s use of vitamin D. |
| **Mineral Oil** | Interferes with vitamin D absorption. |

(University of Maryland Medical Center, 2013).

1. **How is the nutrient measured?**

The nutrient is measure through blood serum levels in the body. Normal levels fall within the range of 20-50 ng/mL. Deficiency is indicated at a level less than 12 ng/mL.(Nelms, 2011).

1. **What is the Upper Tolerable Limits?**

The Upper Tolerable Limit of vitamin D is 25 μg/day for infants and 50 μg/day for all other populations including male and female children, male and female adults, male and female older adults, and pregnant and lactating women. (Nelms, 2011).

**10.What are the physical signs of deficiency?**

Physical signs of vitamin D deficiency include may be muscle, bone, or joint pain, fatigue or muscle weakness, and osteomalacia or rickets. (Nelms, 2011).

 **11.What are physical signs of toxicity?**

Signs of toxicity include anorexia, weight loss, polyuria, and heart arrhythmias. It can also raise blood levels of calcium, which could lead to vascular, and tissue calcification, damage to the heart, blood vessels, and kidneys. Increased rates of kidney stones may also be an indication of vitamin D toxicity. General symptoms include: fatigue, loss of appetite, excessive thirst, dehydration, constipation, irritability, tinnitus, nausea or vomiting, dizziness, and confusion.(NIH, 2014).

References

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