Vitamin B1 (Thiamine)

Vitamin B1 (Thiamine) is a water soluble vitamin that helps with carbohydrate metabolism. Thiamine is indicated for patients with dietary deficiency, beriberi, and Wernicke-Korsakoff syndrome. Alcoholics are at highest risk of developing thiamine deficiency and should be given supplementation before glucose. Although usually administered parenterally, thiamin may also be given intramuscularly. Dietary sources include enriched whole grains and pork.



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Mechanism

Carbohydrate Metabolism

Bread with Metal-balls

Thiamine is a coenzyme necessary for carbohydrate metabolism. Patients consuming carbohydrates as their primary source of calories require higher intake of thiamine.

Indications

Dietary Deficiency

Broken Nutritional-plate

Thiamine is required for carbohydrate metabolism, nervous system function, muscle function, and digestion. Since thiamine is a water soluble vitamin, frequent ingestion is required to maintain sufficient levels in the body. Patients who are pregnant or breastfeeding require significant amounts of thiamine. Thiamine deficiency may lead to serious complications of the brain, muscles, heart, and intestines.

Beriberi

Berries

Thiamine deficiency leads to beriberi. Wet beriberi is characterized by fluid accumulation in the legs and leads to cardiovascular complications such as palpitations, electrocardiogram abnormalities, and high-output heart failure. Although wet beriberi may rapidly progress to circulatory failure and cause death, replacement therapy will quickly alleviate symptoms. Dry beriberi is characterized by neurologic and motor deficit and responds slowly to replacement therapy. Symptoms include anesthesia of the feet, ataxic gait, footdrop, and wristdrop.

Wernicke-Korsakoff

Worm-Mickey Corset-cop

Thiamine deficiency occurs most commonly among alcoholics and is classified as Wernicke-Korsakoff syndrome. A central nervous system disorder, the syndrome presents with neurologic and psychologic manifestations including nystagmus, diplopia, ataxia, and short term memory loss. If Wernicke-Korsakoff is suspected, parenteral thiamine should be administered immediately to prevent irreversible brain damage.

Considerations

Alcoholics Highest Risk

Alcoholic-martini with Up-arrow Risk

Alcoholics have the highest risk of developing thiamine deficiency. They may develop Wernicke-Korsakoff syndrome and experience neurologic and psychologic symptoms. Since thiamine deficiency may cause irreversible brain damage, parenteral thiamine should be administered immediately in patients suspected to have Wernicke-Korsakoff syndrome.

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Give Before Glucose

Before Glue-bottle

Alcoholics are often malnourished and experience insulin dysfunction. Glucose is a carbohydrate commonly given to malnourished alcoholic patients. Since thiamine is required for carbohydrate metabolism, supplementation should be given prior to glucose administration.

Give IM or IV

Given In-muscle by IV-stand

Supplemental thiamine is administered via intramuscular injection or intravenous line. Patients with severe thiamine deficiencies, such as beriberi or Wernicke-Korsakoff syndrome are given parenteral administration of thiamine.

Enriched Whole Grains

Rich Grains

Enriched whole grains provide a good source of thiamine. Since most whole-grains in industrialized countries are fortified with thiamine, foods such as breads and cereals are a good dietary source of thiamine.

Pork

Pig

Pork is the highest source of natural dietary thiamine.

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