

Water Soluble Vitamins

B Group of Vitamins

Vitamin B₁ (Thiamine)

- Water soluble vitamin. Essential in the utilization of carbohydrates.
- It takes part in Krebs cycle.
- In thiamine deficiency there is accumulation of pyruvic and lactic acids in tissues and plasma.

Sources:

- Whole grains, Cereals (Rice, Wheat), gram, Pulses, Nuts, Condiments, oil seeds.
- Meat, eggs, fish, vegetables are poor sources.
- Milk is an important source of B₁.

Thiamine losses

- Being a water soluble vitamin it is readily lost by washing, cooking, milling.
- So people are asked to stop eating highly polished rice and eat paraboiled or undermilled rice.
- The occurrence of Beriberi is determined by the local customs and cultural practice of cooking.

Deficiency of Thiamine

Causes:

i) Alcohol abuse

Interferes with conversion of thiamine to Prevents absorption and leads to chronic (storage)

ii) Other Causes: Malnutrition & anorexia

Malabsorption → Stomach Cancer & IB

Deficiency: i) Wet Beri Beri ii) Dry Beri Beri iii) Wernicke's Encephalopathy

CVS

CNS

i) Wet Beri Beri →

→ Peripheral vasodilation → Sodium and water retention

↓
High circulatory output

↓
Myocardial Failure

↓
oedema.

→ The extremities are warm due to vasodilation.

→ The infants about age of 2-8 months are usually affected due to breastfeeding by a mother with thiamine deficiency.

→ The child presents with edema, oliguria and aphonic cry.

→ If not clinically suspected the child may die.

ii) Dry Beri Beri

- Symmetrical sensorimotor polyneuropathy

- Muscle wasting.

- Foot drop and wrist drops are common.

- Deep hypoaesthesia occurs and it manifests as calf tenderness.

iii) Wernicke's encephalopathy

Brain suffers from ↓ Glucose

- It leads to Korsakoff syndrome.

→ Ophthalmoplegia (6/8 main stem)

(Weakness or paralysis of Eye muscles)

→ Ataxia or unsteady gait (Cerebellum)

→ Changes in Mental state (Limbic system).

→ Confusion, Apathy, Difficulty concentrating

- If untreated → Coma and death.

Kernikoff Syndrome

- Targeted limbic system.

i) Severe memory impairment.

a) Anterograde amnesia (Inability to create new memories)

b) Retrograde amnesia (Inability to recall previous memories).

ii) Compensation.

- Greater intention to fill the gap in memory.

Investigations:-

→ Measure Thiamine levels.

→ MRI → Degeneration of mammillary bodies.

Prevention

- Educating people to have healthy diet.

- Supplementing lactating women.

Recommended allowance

- Body weight is placed at 30mg, more is excreted through urine.

- Patient on haemodialysis should be given supplement of thiamine.