Lecture title: Vitamins :part 1

Lecturer Affiliation: Chapter Two

Summary:

Vitamins are non-energy yielding organic compounds, essential for normal metabolism, that must be supplied in small quantities in the diet.

The importance of vitamins as drugs is primarily in the prevention and treatment of deficiency diseases. Some vitamins do have other empirical uses in pharmacological doses. Vitamin deficiencies occur due to

- inadequate intake,

-malabsorption,

- increased tissue needs,

-increased excretion,

-certain genetic abnormalities

drug vitamin interactions.

Avitaminosis – it is any disease caused by chronic or long term vitamin deficiency.

Hypovitaminosis –decrease of vitamin amount in the organism

Hypervitaminosis –increase of vitamin amount in the organism

Vitamins are traditionally divided into two groups:

(a) Water-soluble (B complex, C):

These are meagerly stored: excess is excreted with little chance of toxicity. They act as cofactors for specific enzymes of intermediary metabolism.

(b) Fat-soluble (A, D, E, K):

These (except vit K) are stored in the body for prolonged periods and are liable to cause cumulative toxicity after regular ingestion of large amounts. Some interact with specific cellular receptors analogous to hormones.

water-soluble vitamins

The vitamin B complex group

1-Thiamine (Aneurine, vit B1)

Absorption and fate: Physiological amounts are absorbed by active transport. When large doses are given orally, some passive diffusion also occurs. Limited amounts are stored in tissues. About 1 mg/day is degraded in the body, excess is rapidly excreted in urine.

Physiological role

After conversion in the body to Thiamine pyrophosphate, it acts as a coenzymein carbohydrate metabolism: decarboxylation of ketoacids and hexose monophosphate shunt. Requirement is dependent upon carbohydrate intake—about 0.3 mg/ 1000 K cal. It also appears to play some role in neuromuscular transmission. Pyrithiamine and oxythiamine are synthetic thiamine antagonists. Tea also contains a thiamine antagonist.

Deficiency symptoms The syndrome of thiamine deficiency beriberi is seen in dry and wet forms:

-Dry beriberi: Neurological symptoms are prominent—polyneuritis with numbness, tingling, hyperesthesia, muscular weakness and atrophy resulting in 'wrist drop', 'foot drop', paralysis of whole limb, mental changes, sluggishness, poor memory, loss of appetite and constipation.

Wet beriberi: Cardiovascular system is primarily affected—palpitation, breathlessness, high output cardiac failure and ECG changes. Protein deficiency is commonly associated and adds to the generalised anasarka due to CHF.