Vitamin B1

Thiamine is a water soluble vitamin. It is found in cereal and meat. Thiamine is readily absorbed by the small intestine by both an active and passive process. The free vitamin occurs in the plasma and in the cell the predominate form is thiamine pyrophosphate (TPP) which is a cofactor for a number of enzymes. About half of the body store is in skeletal muscle. Excretion is in the urine - TPP dephosphorylated in kidney.

Thiamine has a role in carbohydrate metabolism, oxidative decarboxylation of 2-oxo acids and neural function.

Deficiency

Little thiamine is stored in the body and poor nutrition can lead relatively quickly to vitamin deficiency. Alcoholics are an at risk group due to dietary habit and inhibition of thiamine absorption by alcohol. Renal dialysis patients are at risk of water soluble vitamin deficiency and are usually supplemented with thiamine.

Marginal deficiency results in malaise, weight loss, irritability and confusion. Gross deficiency leads to beri-beri. The main effects are cardiovascular and neurological.

Cardiovascular

- Peripheral vasodilatation - high output
- Cardiac failure
- Oedema - wet beri-beri

Neurological

- Peripheral neuropathy
- Wernickes Encephalopathy
- Korsakoffs

Biochemical changes include a lactic acidosis and branched chain ketoaciduria.

Toxicity

Thiamine is non-toxic in large doses. The main problem with intravenous administration is an anaphylactic reaction.

Whole blood thiamine is arguably the assay of choice for investigating thiamine status as depletion of red and white blood cell thiamine exhibits the same kinetics as other body tissues.

Transketolase has been assayed as a functional measure of thiamine status but is influenced by factors other than thiamine depletion (non-thiamine dependent enzymes interfere with the assay).

Plasma and urine thiamine are not reliable indicators of status.

Reference ranges

Adult = 66.5-200 nmol/L
Source: Chromsystems

Marginal deficiency suggested if < 40 nmol/L
Overt deficiency suggested if 5 nmol/L or less

Specimen type

EDTA or lithium heparin WHOLE BLOOD
Minimum volume 200 µL

Storage

Protect from light
Freeze asap after collection

Transport

First class post, ambient temperature.
Protect from light.

Address for specimens

Department of Clinical Biochemistry
Rotherham Hospital
Moorgate Road
Rotherham, S60 2UD

Cost

Contact - annettedavis-green@nhs.net

Method / Turnaround

HPLC assay carried out at least every 2 weeks

Accreditation

Accredited to UKAS ISO15189

External QA

Instand e.V.

Contact person

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