

RGH Pharmacy E-Bulletin

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A joint initiative of the Patient Services Section and the Drug and Therapeutics Information Service of the Pharmacy Department, Repatriation General Hospital, Daw Park, South Australia. The RGH Pharmacy E-Bulletin is distributed in electronic format on a weekly basis, and aims to present concise, factual information on issues of current interest in therapeutics, drug safety and cost-effective use of medications.

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Thiamine deficiency

Thiamine (vitamin B1) is a water-soluble vitamin that acts as a coenzyme in the metabolism of glucose and lipids. The most common cause of thiamine deficiency in Western countries is alcoholism. Alcoholics are particularly predisposed to deficiency due to factors including inadequate dietary intake, impaired gastrointestinal absorption, and impaired hepatic storage. Deficiency can however occur due to any condition of unbalanced nutrition that lasts for 2-3 weeks, e.g. malignancy, hyperemesis gravidarum, and use of total parenteral nutrition without adequate thiamine.

Thiamine deficiency leads to a variety of neurological and cardiovascular signs. Early symptoms may be vague and non-specific, e.g. fatigue, irritability, and abdominal discomfort. Severe deficiency can lead to the development of beriberi: cardiac, or 'wet' beriberi, is characterised by cardiac failure and oedema; 'dry' beriberi is characterised by peripheral neuropathy, muscle wasting and weakness, and paralysis. Wernicke-Korsakoff syndrome may also develop in severe cases of thiamine deficiency, notably in association with chronic alcoholism. Wernicke's encephalopathy involves ocular abnormalities, gait ataxia and mental status changes, and can precede or occur concomitantly with Korsakoff's psychosis, a disorder of short-term memory loss that results in confabulation.

Thiamine, given orally, intravenously or intramuscularly, is used in the treatment and also prevention of thiamine deficiency. The vitamin is available in Australia as thiamine hydrochloride 100 mg/ml ampoules and 100 mg tablets. Recommendations in terms of the appropriate dose, frequency, route or duration of thiamine treatment vary in the literature and depend on both the indication for use and severity of deficiency.

When deciding the route of administration it is imperative to be aware that only small amounts of thiamine are absorbed from the gastrointestinal tract (the maximum amount absorbed after a single oral dose in healthy subjects is approximately 4.5 mg). Parenteral use is therefore usually recommended in severe deficiency to ensure adequate absorption. Adverse effects with thiamine are rare, but hypersensitivity reactions (ranging in severity from very mild to, very rarely, fatal anaphylactic shock) have occurred, primarily after parenteral doses.

Because thiamine is necessary for glucose metabolism, giving glucose in the presence of thiamine deficiency may potentially precipitate Wernicke's encephalopathy. Glucose and thiamine should therefore always be given contemporaneously to those at risk. Some authors stress that a single acute administration of glucose does not appear to cause this effect and, thus, while agreeing that thiamine administration is essential, they caution that urgent administration of glucose should not be withheld pending thiamine administration.

Thiamine hydrochloride 100mg tablets are Authority listed for subsidised supply through the Pharmaceutical Benefits Scheme for "prophylaxis of thiamine deficiency in an Aboriginal or a Torres Strait Islander person" and are also listed as an unrestricted benefit on the Repatriation Pharmaceutical Benefits Scheme.

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FOR FURTHER INFORMATION – CONTACT THE PHARMACY DEPARTMENT ON 82751763 or email: chris.alderman@rgh.sa.gov.au
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