Nutrition Review

Vitamin B_6 Toxicity : a new megavitamin syndrome

Ingrid Glatthaar will be presenting a nutrition review for SA Family Practice at regular intervals. Comments or questions for discussion would be most welcome.

Curriculum Vitae

Ingrid Glatthaar's academic qualifications comprise a B Sc degree from the University of the Witwatersrand Medical School (1963) and a postgraduate Diploma in Therapeutic Dietetics from the University of Cape Town Medical School (1974). Following completion of the latter course, the author worked for two years as a therapeutic dietitian at Groote Schuur Hospital and as an editorial assistant to the late Professor JF Brock, who had a profound influence on the author's professional development. Subsequently, she held the post of a divisional manager in a large South African food company, which included the responsibility of training and supervising a field force of nursing sisters (designated 'nutrition advisors'). In April 1978 she joined the lecturing staff of the Department of Dietetics at Medunsa, where she is still employed.

Miss Ingrid Glatthaar, head of the Department of Human Nutrition at Medunsa.

Vitamin megadosage has been fashionable since the 1960's, mainly as a result of the writings of authors like Adelle Davis[1] and Linus Pauling[2], who proclaimed the efficacy of ascorbic acid (vitamin C) in the treatment of the common cold and other infections.

Orthomolecular nutrition has also been a favourite topic of the lay press, and since nutritional supplements are freely available over the counter, self-prescription of vitamins and other nutrients has become widespread. Dosages of up to 600 times the Recommended Dietary Allowances (RDA) or up to 5 grams/day have been encountered.

On the whole, the intent of such megadosage is not to treat a deficiency of the vitamin, although some 'nutritionists' claim that certain individuals have unusually high requirements, possibly due to an error of metabolism. Usually, however, the purpose is to deliver the megadose to the tissues where it is stored or converted to excess co-enzyme, which is then presumed to accelerate biochemical activity or favour certain biochemical pathways. It is generally acknowledged that any observed clinical effects of such megadosage are pharmacological rather than nutritional, and one well known example of this is the treatment of hypercholesterolaemia with nicotinic acid.

Medical practitioners have also been known to prescribe megadoses of certain vitamins for their patients, and in recent years this has been particularly true of pyridoxine (vitamin B_6). Gynaecologists, in particular, have prescribed pyridoxine for the management of the premenstrual syndrome since Adams and his colleagues[3] reported that pyridoxine relieved the depression associated with oral contraception. Brush[4], Day[5], Taylor and James[6] and Barr[7] have confirmed that pyridoxine relieves a whole range of symptoms associated with the premenstrual state in an appreciable proportion of patients tested. Dosages have ranged from 40-800mg and no side-effects have been reported.

Unfortunately, there is a common yet erroneous conviction that water-soluble vitamins are completely safe, since excess is presumed to be cleared from the body rapidly. The toxic effects of nicotinic acid and ascorbic acid, when given in very large (gram) doses, are now well documented. A recent study by Schaumburg et al[8,9] has demonstrated the toxic outcome of pyridoxine megadosage : seven patients were described who developed a sensory neuropathy, which included progressive sensory ataxia and profound distal limb impairment of position and vibration

sense, following consumption of 2-6g per day of pyridoxine, over a period of 2-40 months. All tendon reflexes were diminished or absent, while the senses of touch, temperature and pain were also impaired, but to a lesser degree. Weakness was not a feature of the syndrome and there were no signs of central nervous system dysfunction, except for a transient Lhermitte's sign in three cases. Although most cases improved satisfactorily after withdrawal of pyridoxine, recovery was gradual and a few cases continued to have residual neurological disease.

Most of the patients began with 50 to 100mg pyridoxine per day, usually for premenstrual tension or depression, and increased it of their own accord to levels exceeding 2g per day (1 000 times the RDA).

None experienced symptoms at doses below 2g per day and, in all but one case pyridoxine was the sole nutritional supplement.

The above reports indicate that megadoses of pyridoxine are not safe. In such dosages the vitamin acts as a drug, not a nutrient, and medical practitioners should exercise appropriate caution in prescribing large dosages of pyridoxine. Furthermore, self-medication by patients and advocation of this practice by quack 'nutritionists' should be strongly discouraged. Particular care with this vitamin is indicated in the case of pregnant women.

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