Matters arising

References

- ¹ Wartenberg R. *Neuritis, Sensory Neuritis, Neuralgia*. New York: Oxford University Press, 1958:233-47.
- ² Schultze F. Akute disseminierte Hauthyperalgesie (multiple sensible neuritis?). *Deutsche Zeitschrift für Nervenheilkunde* 1925;**87**:108-12.

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Biochemical vitamin deficiencies in Friedreich's ataxia

Sir: In their studies of patients with Friedreich's ataxia, Purkiss *et al.*¹ recorded that five of 18 patients "showed enhanced response to thiamine stimulation of red cell transketolase" and two patients had "very low values for red cell transketolase". Prompted by these findings, we determined the vitamin status in two patients with Friedreich's ataxia.

Our patients were a 23-year-old coloured male (GI) and his 22-year-old sister (CI). Each patient fulfilled recommended clinical criteria for the diagnosis of Friedreich's ataxia.^{2,3} Their clinical deficits were similar in severity (Group 1 of Dyck and Lambert⁴) and extent. Symptoms of neurologic disorder had been noticed by GI since the age of 14 years and by CI since the age of 15. In both patients, electrophysiological studies confirmed the presence of peripheral neuropathy and revealed abnormalities of visual⁵ and brainstem auditory⁶ evoked potentials. Red cell transketolase, TPP effect, nicotinic acid, vitamin B₆ and ascorbic acid were determined according to previously published methods.⁷ Serum and red cell folate and vitamin B₁₂ were determined by

the Amersham Combination Radioassay Kit and riboflavin coefficient by the method of Nichoalds.⁸ Vitamin profiles of the two patients on admission and after 16 days in hospital are recorded in the table. In both patients, the following investigations were normal on admission: Serum albumin, transferrin, folate, vitamin B₁₂ and fasting cholesterol; red cell folate; and fasting plasma glucose and triglycerides. On admission, red cell transketolase was in the low range of normal in both patients and patient GI had a markedly raised TPP effect. These findings are in accord with those of Purkiss *et al.*¹ and, on the basis of the levels of transketolase activity, indicate chronic thiamin deficiency in patient CI and acute-on-chronic deficiency in patient GI. Since neither patient received any medication throughout their admission the correction of these deficiencies after 16 days on hospital diet is compatible with a dietary origin for their deficiency, rather than one of abnormal thiamin metabolism. Further support for this concept is provided by the concomitant tendency towards normalisation of riboflavin and ascorbic acid values, which were also indicative of deficiency at the time of admission. In addition, dietary analysis revealed that vitamin intake in both patients was less than that recommended. (Details are obtainable from Dr D Labadarios, PO Box 63, Tygerberg, 7505, South Africa).

Whether dietary deficiency was operative in the patients of Purkiss *et al.*¹ cannot be judged from their published data. At all events, their findings and those reported here would seem sufficient reasons for further studies on the vitamin status of patients with Friedreich's ataxia. The detection of thiamin deficiency and its correction may be of special importance in these patients, given the cofactor function of thiamin for pyruvate dehydrogenase, the role of this enzyme in energy metabolism, and Barbeau's⁹ proposal that defective

energy metabolism may be a key factor in the pathogenesis of Friedreich's ataxia.

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References

- ¹ Purkiss P, Baraitser M, Borud O, Chalmers RA. Biochemical and clinical studies in Friedreich's ataxia. *J Neurol Neurosurg Psychiatry* 1981;**44**:574-80.
- ² Barbeau A. Pathophysiology of Friedreich's ataxia. In: Mathews WB, Glaser GH, eds. *Recent Advances in Clinical Neurology* No 3. Edinburgh: Churchill Livingstone, 1982:125-45.
- ³ Harding AE. Friedreich's Ataxia: A Clinical and Genetic study of 90 Families with an Analysis of Early Diagnostic Criteria and Intrafamilial Clustering of Clinical Features. *Brain* 1981;**104**:589-620.
- ⁴ Dyck PJ, Lambert EH. Lower motor and primary sensory neuron diseases with peroneal muscular atrophy. II. Neurologic, genetic and electrophysiological findings in various neuronal degenerations. *Arch Neurol* 1968;**18**:619-25.
- ⁵ Nuwer MR, Perlman SL, Packwood JW, Kark RAP. Evoked Potential Abnormalities in the Various Inherited Ataxias. *Ann Neurol* 1983;**13**:20-7.
- ⁶ Pedersen L, Trojaborg W. Visual, auditory and somatosensory pathway involvement in hereditary cerebellar ataxia, Friedreich's ataxia and familial spastic paraplegia. *Electroencephalogr Clin Neurophysiol* 1981;**52**:283-97.
- ⁷ Rossouw JE, Labadarios D, Davis M, Williams R. Watersoluble vitamins in severe liver disease. *S Afr Med J* 1978;**54**:183-6.
- ⁸ Nichoalds GE. Assessment of status of riboflavin nutriture by assay of erythrocyte glutathione reductase activity. *Clin Chem* 1974;**20**:624-8.

Purkiss *et al* reply

Thank you for the opportunity to reply to the comments of Drs Gledhill and Labadarios on vitamin status in Friedreich's ataxia arising from our paper (*J Neurol, Neurosurg Psychiatry* 1981;**44**:574-80). In our group of patients, direct blood vitamin assays were not performed nor was a dietary vitamin analysis made. Thiamine status was assessed by measurements of erythrocyte transketolase activity and the effect of thiamine on this enzyme.

Our *in vivo* data indicated that there was

Table Vitamin profiles in the two patients with Friedreich's ataxia (GI and CI) on the first (A) and the sixteenth (B) hospital day

	Normal blood levels	Patient GI		Patient CI	
		A	B	A	B
Red cell transketolase	30.0-50.0 U/L	29.6	53.0	31.8	53.0
TPP effect	<25.0%	36.0	8.3	9.7	6.7
Riboflavin coefficient	<1.15	1.29	1.00	1.48	1.20
Nicotinic acid	5.0-20.0 µg/ml	19.8	13.2	16.9	12.2
Vitamin B ₆	6.0-20.0 ng/ml	8.8	14.4	6.0	8.8
Ascorbic acid	0.250-1.200 mg/100 ml	0.005	0.200	0.230	0.320

TPP = Thiamin pyrophosphate effect

no defect in pyruvate oxidation in any of the patients studied and serum lipoamide dehydrogenase levels, where measured, were normal. However, our observations of reduced thiamine status, which was also demonstrated in the two patients studied by Drs Gledhill and Labadarios, may have implications in the oxidation of pyruvate since thiamine is an essential cofactor in

the pyruvate dehydrogenase complex.

We agree that it may be useful to measure directly the vitamin levels and dietary vitamin intake of a larger group of patients with Friedreich's ataxia, carefully selected with respect to the diagnosis, and of suitable control subjects both on home and institutional diets. Our own patients would not be available for such a study and we

will be interested in any further observations which Drs Gledhill and Labadarios or others may make as a result of such a study.

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Matters arising