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Biochemical vitamin deficiences 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 Lambert[4]) 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 visual[5] and brainstem auditory[6] evoked potentials. Red cell transketolase, TPP effect, nicotinic acid, vitamin B_6 and ascorbic acid were determined according to previously published methods.[7] Serum and red cell folate and vitamin B_{12} 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 B_{12} 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's[2] proposal that defective energy metabolism may be a key factor in the pathogenesis of Friedreich's ataxia.

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

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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