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Is exclusive enteral nutrition enough for children with Crohn's disease?

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Data on micronutrient deficiencies in paediatric Crohn's disease (CD) are scarce. Exclusive enteral nutrition (EEN) is increasingly used as the primary therapy for active paediatric Crohn's disease, improving disease activity and nutritional status[(1)]. The aim of the present study was to assess the effect of EEN on circulating levels of a range of micronutrients in children with active CD.

Thirteen children (six boys) with active CD were treated exclusively for 8 weeks on a polymeric feed (Modulen IBD®; Nestle, Croydon, Surrey, UK). Blood samples for nutrient analysis (Table) were collected at baseline, end of treatment and post-treatment on normal diet (1–4 months post treatment). At baseline several children presented with suboptimal levels of carotenoids, trace elements, vitamins C and B_6 and folate in plasma (Table). Treatment with EEN improved the levels for many nutrients but the plasma levels of antioxidant carotenoids further deteriorated. The latter were improved on normal diet but those micronutrients that had improved returned towards previous levels.

	Before EEN		After EEN		On normal diet	
Micronutrient‡	Median	% with low levels§	Median	% with low levels§	Median	% with low levels§
Vitamin A (μmol/l)	1.2	7	1.7	0	1.2†	8
Vitamin E (μmol/l)	27	0	24	0	25	0
Vitamin E:cholesterol (μmol/mmol)	7.7	0	6.6	0	5.8	0
Lutein (μg/l)	64	79	29.5*	92	108†	25
Lycopene (μg/l)	76	64	12*	100	165†	33
α-Carotenoid (μg/l)	10	64	10	100	14†	42
β-Carotenoid (μg/l)	53	64	41*	92	99†	33
Vitamin D (nmol/l)	64	0	102	0	59†	0
Vitamin C (μmol/l)	29	25	51a	0	46	8
Thiamin (whole blood; ng/g Hb)	559	0	669*	0	573	0
Riboflavin (erythrocytes; nmol/g Hb)	2.5	0	2.5	0	2.1	0
Riboflavin (whole blood; nmol/l)	461	0	477	0	435	0
Vitamin B_6 (nmol/l)	36	29	63*	0	21	42
Vitamin B_6 (erythrocytes; pmol/g Hb)	662	0	721	0	438	0
Vitamin B_{12} (pg/ml)	662	0	843	0	505†	0
Folate (ng/ml)	2.85	42	10.5*	0	7.3	17
Zn (μmol/l)	8.5	75	11.5	64	10	92
Cu (μmol/l)	21.2	8	26	18	24.5	8
Se (μmol/l)	0.5	69	1*	9	0.7†	58
Mg (mmol/l)	0.8	0	0.9	0	0.8	0
C-reactive protein (mg/l)	28	–	7	–	8	–
Albumin (g/l)	28	75	36	42	32	60
Ferritin (ng/ml)	18.4	42	6.9*	64	15.7	17

Values were significantly different from those before EEN (Wilcoxon signed rank test): *$P<0.05$. Values were significantly different from those after EEN (Wilcoxon signed rank test): †$P<0.05$. ‡Plasma, unless otherwise stated. §With reference to normal range.

Children with CD presented with suboptimal levels for many nutrients, some of which improved on EEN. Modulen IBD® lacks carotenoids[(2)] and the results of the present study may have implications for clinical practice and producers of enteral feeds.

1. Levine A, Miller T, Buller H & Markowitz J (2003) *J Pediatr Gastroenterol Nutr* **36**, 464–469.
2. Nestle Nutrition (2008) Modulen IBD. http://www.nestlenutrition.com/NR/rdonlyres/8B8E7D22-646A-44E7-ACFD-AAE900508CB2/0/ModulenIBD.pdf (accessed July 2008).