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Grant awarded £5,521 (1 Year)

n-3 PUFA supplementation in paediatric Crohn's disease: effects on disease activity and growth

This is a pilot study to investigate the prevalence of essential fatty acid deficiency in paediatric Crohn's patients at relapse, and its relationship to malnutrition, dietary intake, inflammation and nutritional therapies (e.g. formulae feeds). On the basis of these results we plan to proceed to an intervention study using dietary essential fatty acid supplements.

Crohn's disease affects 16 per 100,000 children in the UK. Paediatric Crohn's is not only associated with considerable morbidity, as in adult disease, but is also complicated by malnutrition, and retarded growth and development. Corticosteroids, the mainstay of treatment for active disease, are themselves associated with growth retardation whilst nutritional interventions, such as liquid formulae diets, are poorly tolerated over prolonged periods of time.

Essential fatty acids are obligate dietary constituents required for normal metabolism and growth. The two families of essential fatty acids, n-3 and n-6 polyunsaturated fatty acids (PUFAs), have opposing effects on the immune system, where the former appears to act as an anti-inflammatory. An adequate dietary intake of essential fatty acids is required in mammals for normal growth and development. Furthermore, trials of fish oil dietary supplements, a rich source of n-3 PUFAs, have demonstrated significant anti-inflammatory effects in inflammatory diseases including Crohns. Cross-sectional studies in adult Crohn's have demonstrated both an increased prevalence of essential fatty acid deficiency amongst chronically affected patients, and a response of biochemical profiles to dietary supplementation. Paediatric Crohn's patients are likely to be more susceptible to such deficiencies due to the increased demands of growth. There are currently no published studies of essential fatty acid profiles in such patients, despite the postulated complications of deficiencies on growth and inflammation. The demonstration of an increased prevalence of essential fatty acids deficiency would be a strong rationale for a supplementation study.

Patients will be recruited at disease relapse from the paediatric gastroenterology clinic. Following informed consent they will undergo a dietary assessment using a food frequency questionnaire, a clinical assessment of nutritional status including height and have blood taken to determine fat composition of their plasma, white and red blood cells, and markers of inflammation. Following a standard 8-week period of nutritional treatment, with or without corticosteroids, they will again undergo a nutritional assessment and blood tests as above. This will be related a further 8 weeks after the completion of treatment, when the patient is likely to be in remission.

Paediatric Crohn's disease is an important sub-group of the Crohn's population, due to the long term morbidity and possible non-recoverable effects on growth and development. Despite the considerable interest from Crohn's patients and gastroenterologists, studies on nutritional supplements

are unlikely to obtain pharmaceutical funding due to their low commercial value; it is therefore an area dependent on research grant funding. This pilot study will produce unique data, which will be the basis of investigation of an alternative anti-inflammatory preparation in paediatric Crohn's disease.