Paediatric update

Kiran Atwal
Freelance Paediatric Dietitian

Welcome to our paediatric nutrition column 'Paediatric update'. In each column, Kiran Atwal, Freelance Paediatric Dietitian, will update you on new guidance, tools and current affairs. Here, Kiran explores: *Childhood brain tumours and ketogenic diets: promise or pitfall?*

What do we know?

Whilst ketogenic diets (KD) are well-established in drug-resistant childhood epilepsy and some disorders of brain energy metabolism, their role in other clinical areas of paediatrics remains unclear.[1] For cancers of the central nervous system, such as the brain, KD is not currently recommended. A recent systematic review explored its evidence in children with brain tumours.[2]

What was explored?

Evidence that was available between 1995-2022, and recorded outcome measures such as nutritional status, quality of life, mortality, disease progression and adverse events, was included. All types of comparators and KD were considered. From eligible publications, reports of children with diffuse intrinsic pontine glioma, astrocytoma and glioblastoma, across Europe, the USA and Asia were included. The GRADE approach was used to assess the confidence and magnitude of the effects reported.[2]

What was found?

Eleven cases (median age 5.3 years; range 2.5-15.5 years) were eligible and included. KD was followed during disease relapse with neurological deterioration in nine cases. Most followed the classical KD (maximum ratio of 3.5:1) and two followed the Atkins diet. Provision of energy requirements ranged from 75-120% of the recommended dietary allowance, and carbohydrate intake ranged between 5.6-10% of energy intakes. Ketogenic formula was used in seven cases, and medium-chain triglyceride (MCT) oil was used in eight (maximum 150 ml/day). All but one followed the KD for over three months.[2]

The authors' GRADE evaluation found 'very low' and 'low' levels of certainty of the outcome measures reported. The KD was generally well tolerated by the brain tumour patients without major side effects; though three cases refused KD formula, but MCT oil and KD snacks were accepted instead. KD was regularly modified to manage vomiting, constipation and prevent hyperketosis. Only three cases continued with the KD after the specified intervention period. Regarding safety outcomes, three cases reported hyperketosis and hypoglycaemia. One case developed swallowing difficulties (due to disease progression), requiring enteral tube feeding. Few cases reported on nutritional status; where weight was reported, three cases had stable growth whilst following the KD and body mass index improvement was found in one (from -3 to -2 standard deviations).[2]

Six cases showed positive tumour response while following the KD (mainly cases with diffuse intrinsic pontine glioma). Only five of the eleven cases reported improvement in neurological condition and quality of life. Survival outcomes were not consistent or clear across the cases and, as such, were not reported.[2]

So, what does this mean?

Research on the therapeutic use of KD in children with brain tumours is poor and based on few cases. Where data exists, as presented in this systematic review, there are inconsistencies and low to very-low certainty of the findings.[2] Heterogeneity was present across the cases, from the outcome measures used, frequency of data collection, disease status and concurrent cancer treatment. The implementation of the KD was also inconsistent, where different types of KD and levels of energy and carbohydrate restriction were utilised.[2] Case studies by design do not provide robust evidence, and the lack of control data enables confounding variables. As such, the outcomes cannot be reliably compared or attributed to the KD.

In summary

Given the challenges of conventional cancer treatment and living with the disease, families may seek alternative diets, and implementing restrictive diets such as the KD may add unnecessary burden.[3] The mainstay of care should continue to provide individualised and supportive dietetic input with a multidisciplinary team, which aims to optimise nutritional status, especially as conventional treatment may disrupt normal gastrointestinal function, and while the efficacy of KD in childhood brain tumours is better understood.[4]

References: **1.** Ackrill J, Appleyard V, Whiteley V (2020). Ketogenic Diets. In: Clinical Paediatric Dietetics.; doi.org: 10.1002/9781119467205.ch17. **2.** AlMutairi H, *et al.* (2025). Safety, Feasibility, and Effectiveness of Ketogenic Diet in Pediatric Patients With Brain Tumors: A Systematic Review. J Nutr Metab.; 2025: 7935879. **3.** Schwartz KA, *et al.* (2018). Investigating the Ketogenic Diet As Treatment for Primary Aggressive Brain Cancer: Challenges and Lessons Learned. Front Nutr.; 5: 11. **4.** Ward E, Evans J. (2020). Childhood Cancers and Immunodeficiency Syndromes. In: Clinical Paediatric Dietetics.; doi: 10.1002/9781119467205.ch18.