

Use of Keyo[®] in the ketogenic diet of a paediatric patient with drug resistant epilepsy

Victoria Whiteley, Clinical Lead Ketogenic Dietitian
Royal Manchester Children's Hospital, UK



Patient Details & Medical History

Age:
10

Gender:



Diagnosis:

Generalised epilepsy which presented at 2 years of age

Relevant history:

Due to learning difficulties, patient attends a school for children with special educational needs and has respite support

Relevant medical history:

Seizures daily including absences, drop seizures and tonic clonic seizures, resulting in slow progress at school.

Ataxia and can experience periods of drooling and swallowing difficulties (holding food in her mouth for long periods) which may or may not be associated with exacerbations of seizures.

Due to dental damage as a result of head drop seizures the patient was following a soft, mashed diet. She was already seeing a Dietitian at her school for nutrition support advice and was prescribed a daily high energy juice based paediatric supplement drink.

Despite trialling 6 anti-epileptic drugs has continued to have seizures daily. At 8 years and 9 months of age the patient was referred to the ketogenic diet service.

Medications: Ethosuximide, sodium valproate and clobazam



Dietetic Assessment

Goals of dietary treatment:

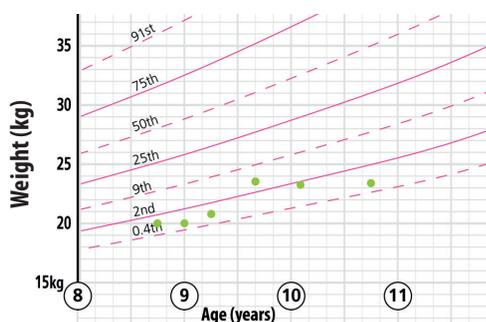
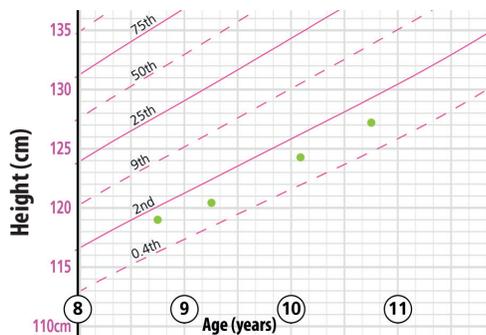
To reduce number of seizures and ensure appropriate growth and micronutrient intake.

Relevant biochemistry:

All screening bloods for ketogenic diet were normal but highlighted vitamin D deficiency (corrected with a high dose colecalciferol for 6 weeks and then standard supplementation).

Anthropometrics:

On referral - 20kg, 119cm (8 years, 9 months)



Estimated energy requirements and ketogenic diet prescription:

Daily energy requirement	1280kcal
Chosen ketogenic ratio	3:1
Macronutrients	123g fat 21g protein 21g carbohydrate
Daily meal plan	3 x 426kcal meals (breakfast, lunch & dinner)
Macronutrients per meal	41g fat 7g protein 7g carbohydrate
Micronutrients	1 x 6g sachet Fruitivits

Education and training

- Parents were provided with and trained on using an electronic ketogenic management programme (EKM).
- Provided with a bank of recipes to get them started; 3 breakfasts and 9 main meals.

3 month follow-up - 20.1kg, no height obtained (9 years)

Managed CKD for 3 months, although parents found it difficult to calculate recipes and diet plans (due to the protein restriction) so, opted to move to the modified ketogenic diet (MKD). Energy requirements were recalculated to 1380kcal/day due to poor intake and slow weight gain.

Macronutrient	Daily allowance	g/day or meal	Food choices
Fat	minimum 70%	110g 3 x meals = 30g 1 x supper = 20g	11 x 10g fat choices/day
Carbohydrate	20g	20g (distributed equally throughout the day)	20 x 1g or 4 x 5g carbohydrate choices (or a combination of both)
Protein	Moderate (Normal intake)		

Guidance on food choices was provided, there was no recommendation on protein amount and Mum was advised to spread the fat allowance throughout the day. Food label training was provided.

Speech and Language Assessment

Advised a soft/mashable diet due to dental damage and sometimes she can 'forget' to chew.

6 month follow-up - 20.9kg, 120.4cm (9 years 3 months)

Ketones had been consistently > 3mmol/l and a 50% reduction in seizures, but dropped to <3mmol/l. Carbohydrate restriction was reduced to 15g per day to promote ketosis, and fat was increased to 125g per day and ketones then improved to > 3mmol/l again.

12 month follow-up - 23.6kg, no height obtained - refused (9 years 8 months)

Weight improved and Mum was able to devise meals throughout the day keeping to the dietary restrictions, however found it challenging to include the level of fat required as well as protein foods due to the texture modification. Maintaining ketosis became difficult to achieve with ketones dropping to 1.8 - 2.2mmol/l. The patient's swallow deteriorated and compliance with Fruitivits reduced to approximately 50% intake. Dietitian prescribed 1-2 pots of keyo per day.



18 month follow-up - 23.25kg, 124.2cm (10 years 1 month)

The patient experienced an episode of tonsillitis and as a result Non Convulsive Status Epilepticus. She was reluctant to eat although tolerating keyo as well as taking medication and drinking water freely. An illness plan was devised to provide 4-5 pots of keyo to meet nutritional requirements. This ensured:



} 120 - 150g fat/day

- ✓ Energy requirements achieved
- ✓ High fat intake (1200-150g/day ~90% energy intake)
- ✓ Protein requirements met (32 - 40g)
- ✓ Restricted carbohydrate (8 - 10g)
- ✓ Increased vitamin and mineral intake to meet LRNI
- ✓ No weight loss
- ✓ Maintained ketosis (>3mmol/l)

Post illness

As the patient's condition improved, the intake of keyo reduced to 1-2 pots per day as she was able to resume to her normal ketogenic diet.

Conclusion

This case highlighted the difficulty of adhering to the ketogenic diet alongside swallowing difficulties and how keyo assisted in overcoming these challenges by providing a palatable, semi solid textured and low volume food. Keyo was used in 2 ways: 1) as a ready to eat supplement to add fat and variety to such a restricted diet and 2) as a sole source of nutrition during times of poor nutritional intake.



Innovation in Nutrition
A Nestlé Health Science Company

Fruitivits and keyo are foods for special medical purposes

© Reg. Trademarks of Société des Produits Nestlé S.A., Vevey, Switzerland.

VitaFlo International Ltd, Suite 1.11, South Harrington Building, 182 Sefton Street, Brunswick Business Park, Liverpool L3 4BQ, UK.

Tel: 0151 709 9020 www.vitaflo.co.uk

All information correct at the time of print

March 2018