An infant, patient A, was noted to be slow to learn to crawl and walk as well as exhibiting symptoms such as unsteady movements, eye flickering and speech delay. Aged 21 months, he had his first epileptic seizure. Over the following months he had further seizures and became progressively more ataxic. After multiple investigations he was diagnosed with late onset Glut-1 DS.

In November 2008 he was referred for a ketogenic diet and was commenced on a modified MCT version of this regimen. This was prescribed to provide 30% total energy intake from MCT, 40% as LCT (total 70% fat), 10% as protein and 20% as carbohydrate. LCT was provided by a range of high fat foods such as double cream, mayonnaise, butter, cheese and processed meats e.g. salami.

This regime proved very effective in achieving adequate ketosis and improving his symptoms and quality of life. The exact breakdown of fat, carbohydrate and protein has been adjusted as required to maintain good levels of ketones. Developmentally he has progressed; his speech has significantly improved and, provided he is well and ketotic, he does not have seizures or ataxia. Growth is normal and he is currently on the 50th centile for height and weight.

Regular monitoring of plasma lipids revealed that his total cholesterol, in particular the LDL fraction, had increased since commencing the diet to above the normal range. It was decided to reduce his intake of around 35g/day saturated fats from his diet (not including the MCT intake), by substituting with mono and polyunsaturated fats to see if this would prevent further rises or even correct his dyslipidaemia. **carbzero** was introduced as a replacement to double cream and milk on breakfast cereals and in drinks as a milk-like source of LCT fat with the majority of the fatty acids being mono and polyunsaturated. He tolerated **carbzero** very well and continues to take around 200ml daily. Satisfactory levels of ketosis have been maintained since implementation of the dietary changes. His LDL cholesterol fell into the normal range within 2 months of introducing dietary changes. Total and LDL cholesterol levels have been sustained in the normal range for over 2 years post dietary intervention.

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**Case Study 2 – The use of carbzero in the ketogenic diet**

Patient B was established on a ketogenic diet aged 7½ years, using Ketocal®, cream and olive oil. Six months later, carbzero was introduced to replace Ketocal®. The quantity of carbzero was built up over one month to the patients final prescribed intake. It was found that the best way to incorporate carbzero into the diet was to mix small but gradually increasing amounts with whipping cream. After one month of being on a stable intake of 250ml carbzero mixed with 250ml of cream, a gradual reduction of cream commenced. Within a month a daily intake of 500ml of carbzero and 30ml of olive oil was achieved.

Dietary compliance continues to be excellent with carbzero being taken as a morning and bedtime “milk-like drink”.

From commencing the ketogenic diet the patients blood lipid profile showed an increase in cholesterol and triglycerides. This is not an uncommon occurrence in these patients1, 2. Although the cardiovascular risk associated with this has not been formally evaluated, it is recommended saturated fat intakes are reduced where possible3. However, since the introduction of carbzero to replace both Ketocal® and cream, her blood lipid profile has started to improve slightly.

The patient has achieved steady maximum ketone levels from the start of the ketogenic diet and her mother reports that her behaviour and communication are much improved since commencing it. In addition, her epileptic episodes have reduced to one every morning leading to her neurologist reducing her antiepileptic medication.

**Case Study 3 – The use of carbzero in the ketogenic diet.**

Patient C had his first epileptic episode aged 12½ years. Until the age of 20 he only achieved moderate seizure control, trying many different doses and combinations of medication. For the next 7 years he achieved better seizure control, reporting only two severe episodes. However he also experienced many epileptic auras, absences and facial spasms.

In June of 2011 he was commenced on a 3:1 ketogenic diet. His dietary compliance was poor, with almost no improvement in seizure control. In November 2011 he was commenced on a 4:1 ketogenic diet, using Ketocal®, cream, avocados and olive oil. His compliance with this regime was better and he started to experience a reduction in epileptic episodes.

In January 2012, he started using carbzero and his compliance improved further. He achieved a significant decrease in epileptic episodes. He was established on 750ml carbzero, 30 ml olive oil and 100g of avocado daily and found this achievable.

Currently he continues on this regime and reports that as long as his ketone levels remain steady and high he can go 3-4 weeks without experiencing any epileptic episodes. He does report facial spasms and absences up to 2-3 times a day when he is stressed or tired.

The 4:1 ketogenic diet including carbzero has enabled him to reduce one of his anti-epileptic medications and after realising the significant health benefits he has become an enthusiastic fan of the ketogenic diet and carbzero.