**Is the modified Atkins diet an alternative to the ketogenic diet in refractory childhood epilepsy?**

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Epilepsy is a chronic disease that affects 0.5%-1% of the population. Approximately 25-30% of the population have persistent symptoms despite antiepileptic drugs. The ketogenic diet is a widely used treatment for refractory childhood epilepsy. It is a diet that usually consists of a 4:1 ratio of fat to carbohydrate and protein. The ketogenic diet is very restrictive and difficult to tolerate, thus leading to poor compliance.1 The modified Atkins diet was created at Johns Hopkins Hospital to propose a less restrictive and more palatable regimen. It uses a 1:1 ratio of fat to carbohydrate and protein.2 More recent studies have shown modified Atkins diet is well tolerated and effective in treating refractory epilepsy.3 Although the mechanism of action for both diets is unclear, current research suggests that both treatments should be considered when treating drug-resistant epilepsy.

This led me to my PICO question: Is the modified Atkins diet as effective as the ketogenic diet in children with refractory childhood epilepsy? A literature search using PubMed, EMBASE, Cochrane Library and CINHAL was performed using a combination of the following search terms: “modified Atkins diet”, “epilepsy”, “seizure”, “children”, “ketogenic diet”. The search yielded 1 randomized controlled trial, 1 single-arm prospective cohort and 1 retrospective cohort to critically appraise.

The randomized controlled trial by Kim et al. (2016) compared the efficacy, safety and tolerability of the modified Atkins diet with the ketogenic diet. The results showed no significant difference between the all modified Atkins diet and all ketogenic diet groups when looking at those who did not achieve >50% seizure reduction at 3 and 6 months. However, a subgroup analysis showed that the 1 to <2 year ketogenic diet group achieved greater seizure control when looking at >90% reduction in seizures at 3 months. There was also a significantly increased incidence of hypercalciuria in the ketogenic diet group at 3 months, but not at 6 months. This study was limited because the patients and family were not blinded to their diet. The retrospective cohort by Porta et al. (2009) compared seizure reduction between the ketogenic diet and the modified Atkins diet group, and also looked at serum long chain fatty acid profiles. The results showed weak evidence that more patients did not achieve >50% seizure reduction at 3 months if they were on the modified Atkins diet, but there was no difference between groups at 6 months. This study suggested better compliance in the modified Atkins diet group. There were fatty acid levels drawn at 1, 3, 6 and 12 months on either diet, and significant changes were observed, but its meaning is unclear. This study was limited as it was a retrospective study that was not adequately powered, and had potential for multiple biases. The Miranda et al (2011) study compared the effected of the modified Atkins diet as a single arm prospective study compared to historical retrospective study of patients who were treated with the ketogenic diet. The data suggests there is no significant difference in the number of patients who did not achieve 50-90% or >90% seizure reduction at 6 months. This study was limited by its design as the modified Atkins group was compared to a previous retrospective study with potential for multiple biases.

The only valid study in this group was by Kim et al (2016). Although there were no statistically significant findings between the majority of comparisons, when looking for non-inferiority, there were consistently fewer patients who did not achieve >50% seizure control in the ketogenic diet group in all three studies. This suggests that the ketogenic diet may be a better treatment than the modified Atkins diet. However, the studies also suggest that the modified Atkins diet may be more tolerable with fewer potential side effects, which may make it more feasible leading to better compliance. The modified Atkins diet appears to be as effective as the ketogenic diet and it should be considered as an alternative treatment in refractory childhood epilepsy.

References:

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